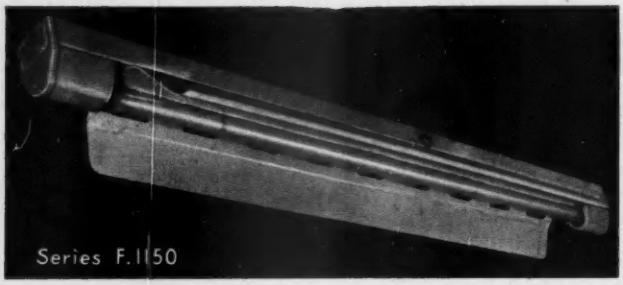
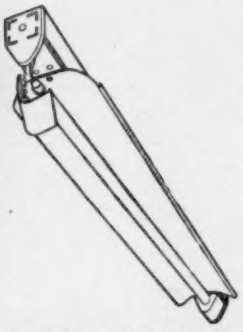
ELECTRICAL TIMES

THURSDAY
19 JULY
1951
NINEPENCE





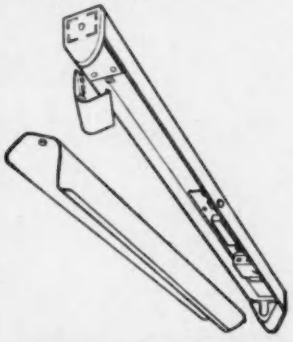
New Mazda Fittings with unique design—simple, sturdy and efficient

Note these outstanding features :—

- Fittings of robust sheet steel construction, bonderised to prevent rust.
- Covers conceal lamp ends and support the lamp without spring clips.
- Reflector gives 20° cut-off and can be supplied with upward light slots.
- Provision is made for chain, conduit or ceiling mounting.
- Embossed ends interlock when fittings are mounted in continuous line.
- New type of BTH Choke gives virtually silent operation and has no filling.

Available for single and twin 5 ft. lamps.

FOR IMMEDIATE access to lamp-holders, slide end-covers towards centre of fitting. End-covers will then come away.



TO REMOVE reflector for access to lamp auxiliary gear, loosen single captive knurled screw at one end of the fitting and slide reflector out from the other.

**Write for descriptive leaflet No. 9613-1*

For leadership in lighting say Mazda!

THE BRITISH THOMSON-HOUSTON CO. LTD., Crown House, Aldwych, London, W.C.2.
(Member of the A.E.I. Group of Companies)

M-4335

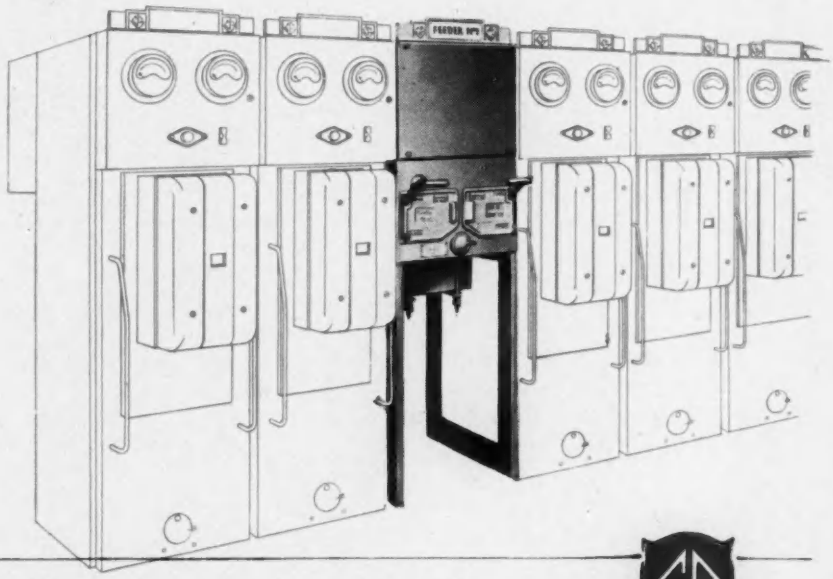
A feeder control unit for any position in the switchboard

The new Crompton Parkinson A.S.A.1 fault making, load breaking metalclad switch unit is interchangeable with Crompton Parkinson A.L.A. metalclad air insulated switch units. This means that you can fit the new unit in any position in the switchboard. And if an automatic switch is needed later, you can make the change with very little trouble.

The interlocks are directly visible, immensely strong and make the unit as fool-proof as possible.

Rating at 11 kV or 6.6 kV
Continuous full load...400 amps
Fault making ...250 mVA
Short time thermal ...250 mVA for 3 seconds

Crompton Parkinson Ltd. are members of the Association of Short-Circuit Testing Authorities and operate one of the approved A.S.T.A. testing stations.



OWNERS OF AN APPROVED ASTA TESTING STATION

Crompton Parkinson LIMITED

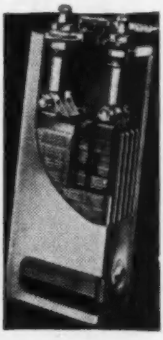
ELECTRICAL EQUIPMENT

Compton House, Aldwych London W.C.2.
Telephone: Chancery 3333. Telegrams: Crompark Estrand, London.

STANDS UP TO HARD USE

Physically, chemically and electrically, Nife batteries are gluttons for work. Physically, because Nife is made principally of steel. Chemically, because the electrolyte is almost inert, the gravity remains constant during charge and discharge and any gas produced is virtually innocuous. Electrically, because a Nife battery shows instant recovery of voltage even after a complete short circuit. As a result, Nife batteries cost practically nothing to maintain. It is not surprising that many users of electric vehicles rely entirely on Nife.

(*N.B. Nife batteries are not yet available for private cars or domestic radio.*)



CUT YOUR COSTS WITH NIFE STEEL BATTERIES

NIFE BATTERIES · REDDITCH · WORCESTERSHIRE

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with confidence, as only OKERIN Waxes are used.

Yours faithfully,
J. Power Factor
A.M.I.E.E.

P.S. Waxes are small in bulk, but bulk large in importance, - they must be just right for the job, and reliable. Always Specify OKERIN.

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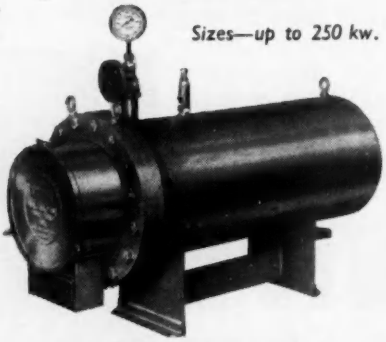
"Dunlow"
ELECTRIC CENTRAL HEATING WATER BOILERS



Sizes—up to 250 kw.

Suitable for converting existing systems

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290 BELL STREET, GLASGOW, C.4
Telephone: Bell 1961-2 *'Grams:* "Immerser, Glasgow"

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For Motors, Generators and Alternators. Also as Series Regulators for voltage, neat and speed control. We shall be pleased to send full particulars and prices on request. And remember, the advice of Cressall Technicians is always available.

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Registered Trade Name of
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ALMOST A PLEASURE...

the Hotpoint way

The time it takes to complete the family wash with the HOTPOINT washer is a pleasure compared to the drudgery and upheaval of the normal washday. With the power-driven safety wringer clothes washing holds no terrors for the housewife. The popularity of the HOTPOINT machine may mean that your customers may have to wait awhile, but to wait for a HOTPOINT is to wait for the best.

A Festival of Britain exhibit

It pays TO STOCK, SHOW AND SELL

Hotpoint DOMESTIC APPLIANCES

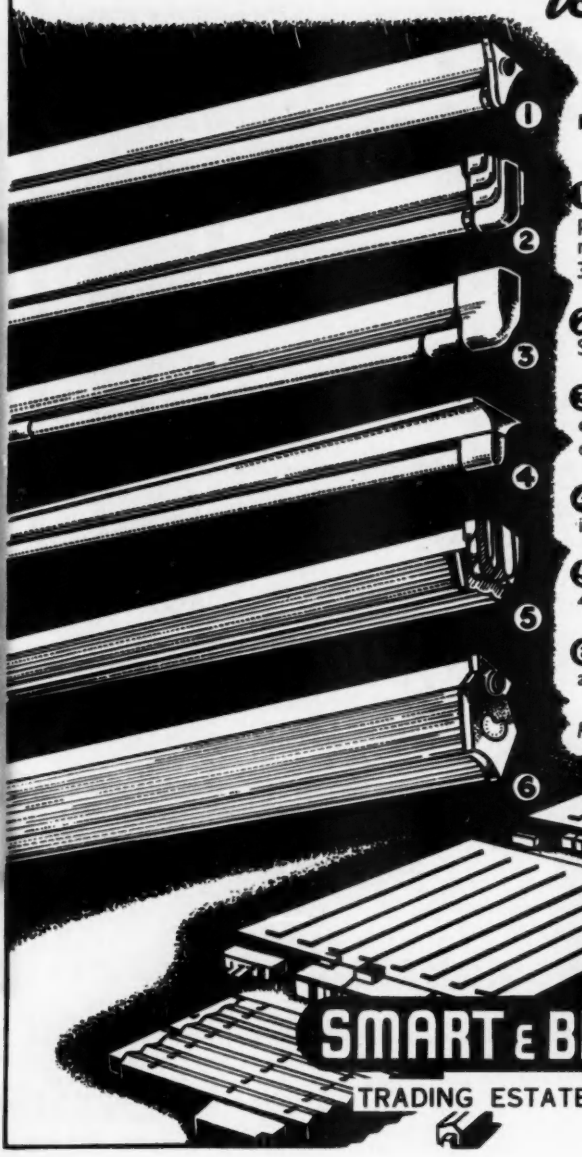
The Hotpoint Electric Appliance Co. Ltd., London, W.C.2

Member of A.E.I. Group of Companies

DESIGNED and PRODUCED UNDER ONE ROOF!

Batten Fittings

for
INDUSTRIAL, COMMERCIAL
and DOMESTIC USE.



1 "MAXILITE"!—The most popular fluorescent fitting ever marketed. Available in 2' 0", 3' 0" and 4' 0", Single or Twin.

2 M.B. 14. Available in 4' 0", Single or Twin.

3 C.B. 15. The ultimate form of 5 ft. 80 watt batten unit design.

4 S.B. 15. SEAGULL. Available in 5 ft. 80 watt, Single or Twin.

5 GB/S 24. Available in 4' 0" Twin.

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Please send for illustrated leaflet.

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TRADING ESTATE, SPENNYMOOR.
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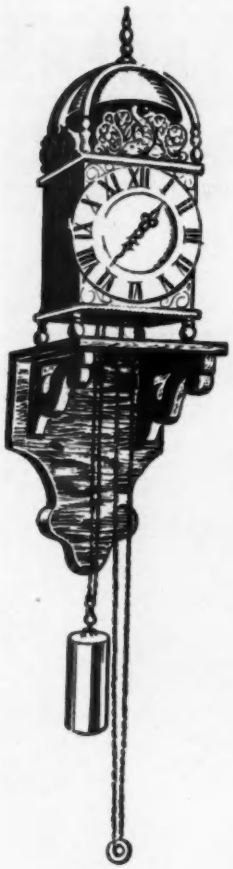
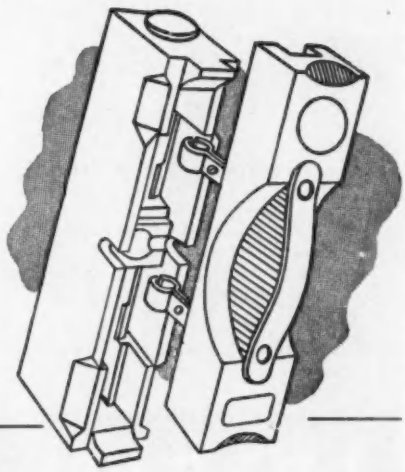


Continuous Reliability

"Continuous Reliability" is exemplified by Old Cromwellian Lantern Clocks which have kept good time through the centuries. Even so, they are no more dependable than Slydlok Fuses, which you can rely upon to withstand arctic or tropical conditions, to fix into the most awkward positions, and to stand up to the severest forms of vibration, or sudden concussion. There are two types of Slydlok Fuse, the popular "X" type (5-60 amp) and the more recent "G" type (15-100 amp), which includes spare fuse wire in each holder and accepts HRC Cartridges. Write today for full details.



SLYDLOK

THE FUSE YOU WILL EVENTUALLY USE

EDWARD WILCOX & CO LTD

Tel.: Wythenshawe 2235/6/7 Grams: Slydlok Manchester

SHARSTON ROAD · WYTHENSHAWE · MANCHESTER

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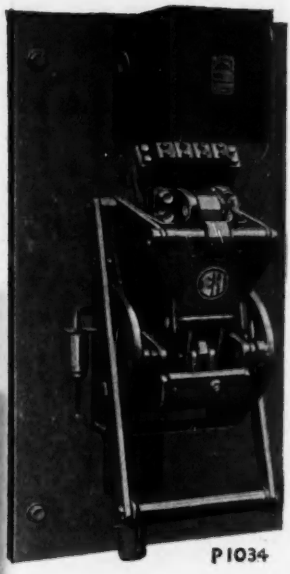
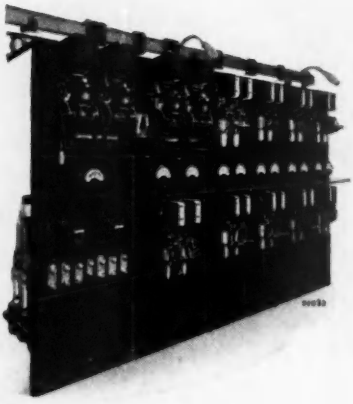


P1034

DIRECT CURRENT CIRCUIT BREAKERS *and* SWITCHBOARDS



Whether you require A.C. *or* D.C. SWITCHBOARDS *or* A.C. MOTOR CONTROL GEAR, *you get the same reliability, robust construction and negligible upkeep if you . . .*

Specify "ERSKINE HEAP"

SWITCHGEAR 50 to 5,000 Amps. CONTROL GEAR ¼ HP to 5,000 HP

May we have your enquiries?

ERSKINE, HEAP & Co LTD

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IN ALL PARTS OF THE WORLD

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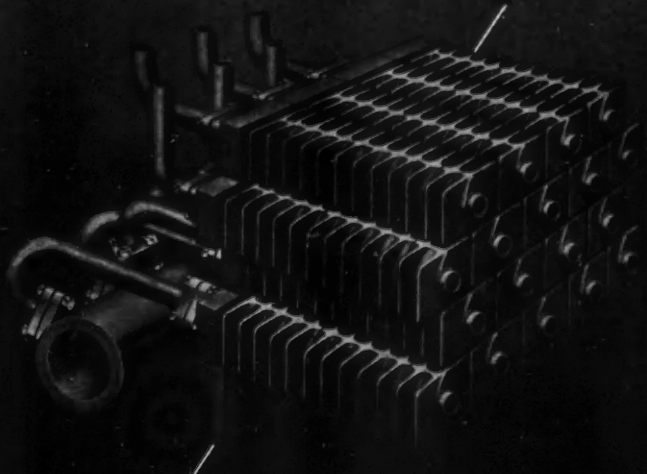
The truly modern DESIGN



The illustration shows Green's Premier Diamond Economiser, Type 12, with steel tubes and cast-iron gilled sleeves.

PREMIER DIAMOND
GREEN'S economisers
E. GREEN & SON LTD., WAKEFIELD

Makers of economisers for one hundred years

GE58

HIGGS MOTORS
TRADE MARK
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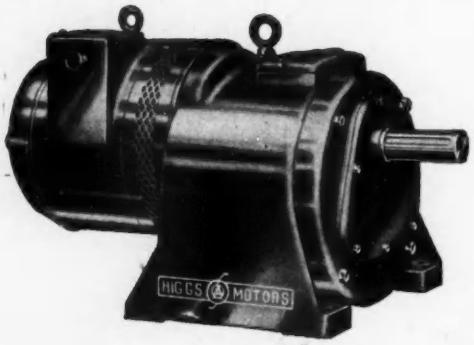

We are one of the few firms completely manufacturing motor and gear box; we grind all gears calling for this operation, and believe we are the only electric motor firm in this country making gear units with ground gears

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FERRANTI
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A 58·5 MVA 11/134 kV
FERRANTI GENERATOR
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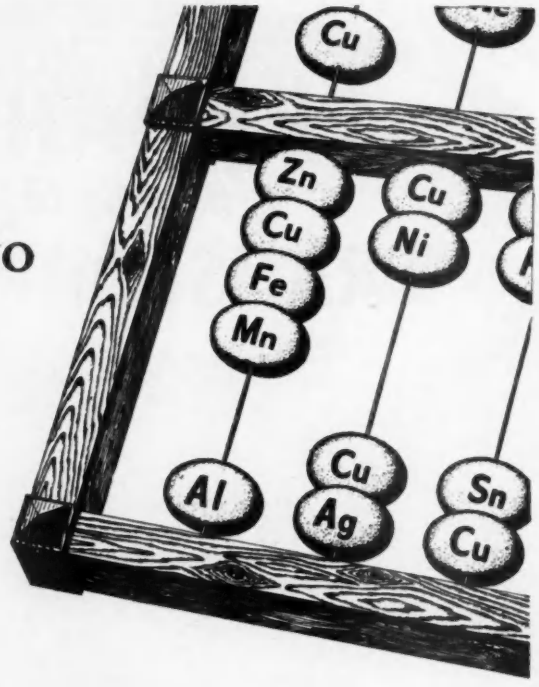
FT108

B/52

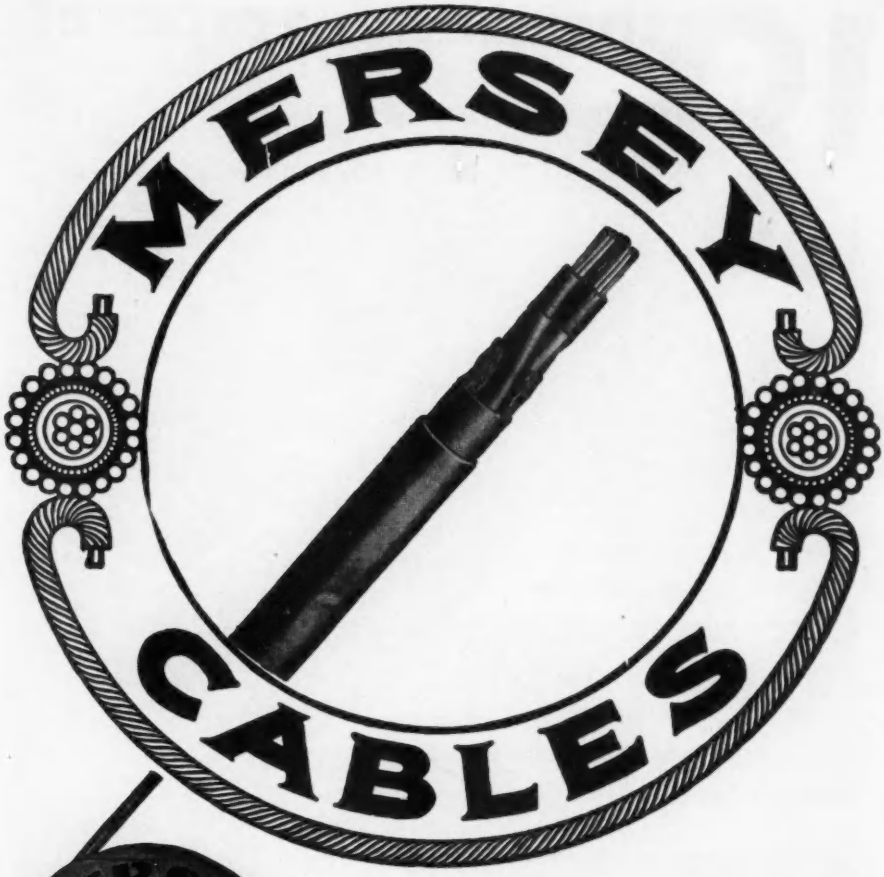
Putting two and two together with COPPER



So successfully have metallurgists put two and two together that copper and its alloys have become indispensable materials in almost every branch of industry. Putting two and two together in a different sense is also the task of the Copper Development Association. By appraising the results of experience and research and advising on their practical application in industry, the C.D.A. helps to ensure the most efficient and economical use of the metal and its alloys. Backed by the full resources of the British copper industry, the Association is a non-trading organisation from which you can obtain, without charge or obligation, full advice on what copper and its alloys can or cannot do.

COPPER DEVELOPMENT ASSOCIATION

KENDALS HALL, RADLETT, HERTS. PHONE RADLETT 5616



All Sizes of rubber insulated wires, cables and flexibles are made under the famous MERSEY name. *Illustrated is a 7/.029 Three Core Circular V.I.R. Insulated, Taped, Lead Alloy Sheathed, 250 volt Grade Cable. To B.S. — No. 7/1946.*

MERSEY CABLE WORKS LTD., BOOTLE, LIVERPOOL. *Tel. BOOTLE 4111 (4 lines)*

A TI COMPANY

10 thousand amperes

. . . is the total output obtained from these oil-immersed rectifiers at the Works of THE BRITISH PISTON RING CO. LTD. (by whose permission this photograph is reproduced), and adds to the millions of amperes already being supplied by . . .

WESTINGHOUSE

WESTALITE PLATING RECTIFIERS

The very high overall efficiency of "Westalite" rectifiers is maintained at a high value even down to a light load, a matter of considerable importance, since it is rarely possible to operate the bath to enable the rectifier to run at full load the whole time. Add to this the fact that because of their static nature they require no renewals, little maintenance, and therefore running costs are reduced to a minimum, you will agree that "Westalite" rectifiers are a very good proposition. To obtain details of our extensive range

write for DATA SHEET No. 44 to Dept. E.T. 14

WESTINGHOUSE BRAKE & SIGNAL CO. LTD.

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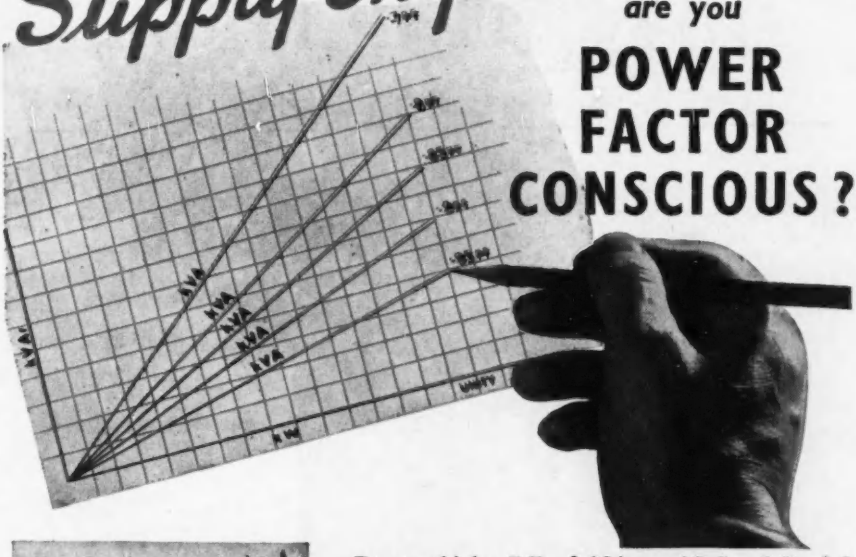
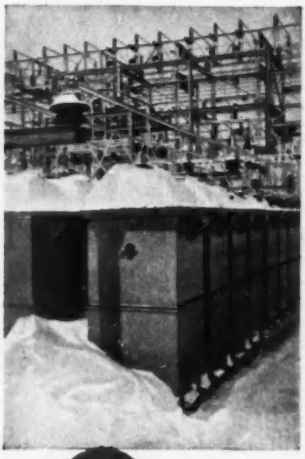
Supply Engineers — are you POWER FACTOR CONSCIOUS?





Do you think a P.F. of ·95 is good? Is a P.F. of ·8 tolerable? The idle component of the current is over 30% with the former and 60% with the latter. Neither is really good enough if you wish to deliver maximum power, minimise losses and reduce the voltage drop in your system to the lowest possible figure.

Have you considered using shunt capacitors to improve your power factor?

Today capacitors can be obtained as reliable and durable as the other components of your system . . . if you specify BICC Power Capacitors.

These high quality products are the result of nearly 40 years' research and development and have a guaranteed efficiency of not less than 99·87%. Unlike most other items of electrical apparatus, they require practically no maintenance.

They can be connected as individual units at motor terminals and distribution boards, and in small or large banks at secondary or main sub-stations.

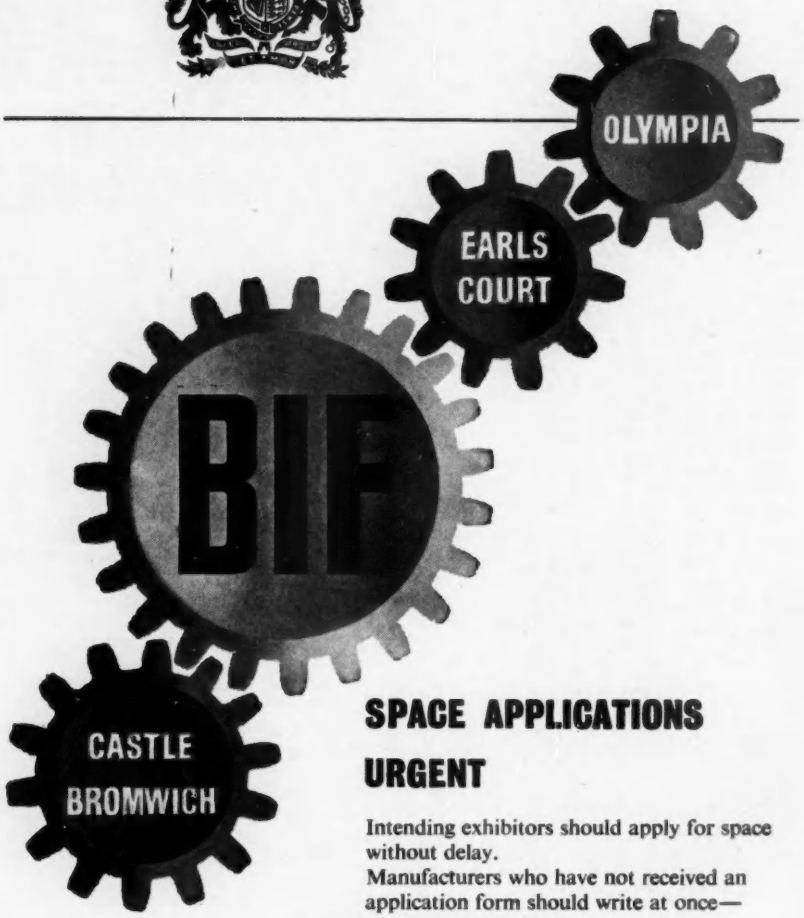
The illustration shows a 20,250 kVAr bank of BICC Capacitors supplied to the Aluminum Company of Canada Ltd. It comprises eighty-one 250 kVAr single-phase units connected for operation at 10·3kV.

Further information is available in Publication 278Q

B.I. Callender's

POWER CAPACITORS

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2



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Manufacturers who have not received an application form should write at once—

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BRITISH INDUSTRIES FAIR · MAY 5-16, 1952

'ENGLISH ELECTRIC'

switchgear

High voltage air-blast circuit-breakers for outdoor service

Tested for breaking charging currents of long lines

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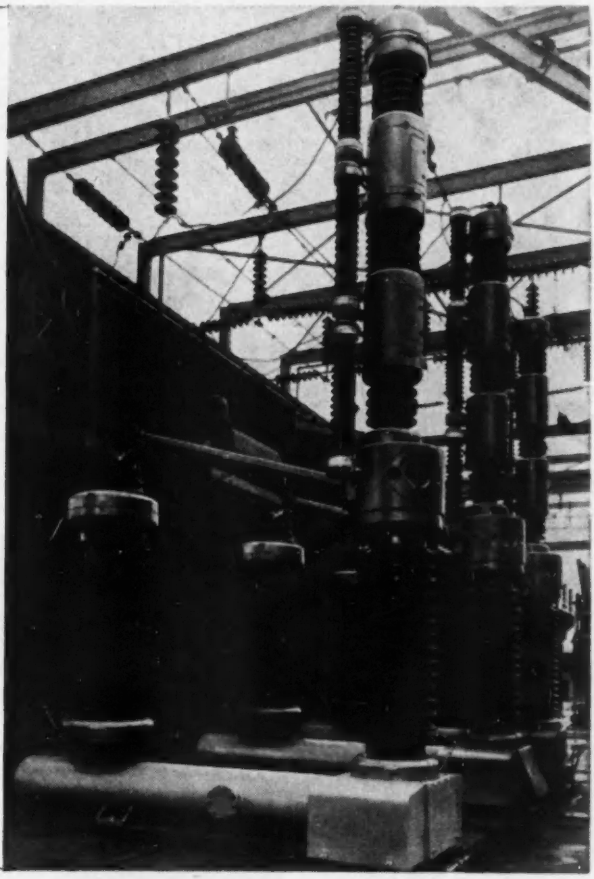
Illustrated is a 165-kV, 3,500-MVA air-blast circuit-breaker recently tested for breaking line charging currents at Fontenay, France.



The ENGLISH ELECTRIC Company Limited

QUEENS HOUSE, KINGSWAY, LONDON W.C.2

Switchgear Department, Stafford

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL

SH.1

Non-corrodible die-cast top member
Rubberised asbestos washer
All-porcelain body, incorporating lampholder in one piece
Fixing screws, 2 in. centres
Heavy gasket providing positive watertight joint
Screw neck pressed glass globe
STANDARD DISPERSIVE REFLECTOR MODEL
STANDARD ANGLE-CONCENTRATING REFLECTOR MODEL
STANDARD DISTRIBUTIVE REFLECTOR MODEL

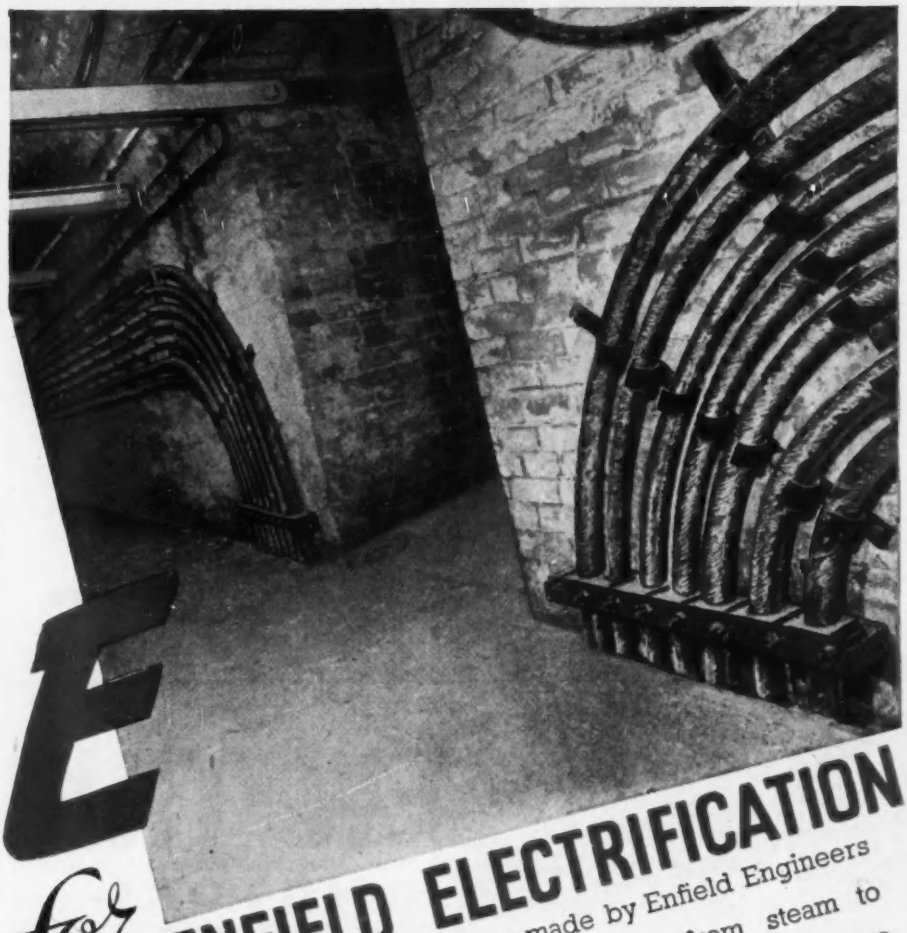
R·E·A·L

Non Corrodible Watertight Fittings

Send for Leaflet of Complete Range

60 WATT FITTINGS
100 WATT FITTINGS
200 WATT FITTINGS

Issued by ROWLANDS ELECTRICAL ACCESSORIES LTD., R·E·A·L WORKS, BIRMINGHAM, 18



E for ENFIELD ELECTRIFICATION

This is a simple cable run made by Enfield Engineers as part of a changeover scheme from steam to electricity. The Mills of Yorkshire and Lancashire are changing over to electrical drive, and Enfield are fully equipped, with material, plant and experience, to help.

ANY VOLTAGE ALMOST ANYWHERE
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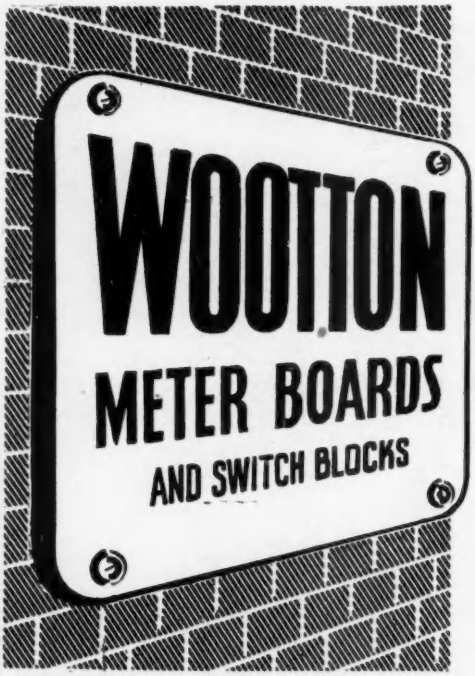

We have been making and supplying the Electrical Industry with METER BOARDS and Switch Blocks for over 27 years

- *FIRST CLASS WORK*
- *QUICK DELIVERIES*
- *COMPETITIVE PRICES*

We invite your enquiries

WOOTTON & CO., LTD.
ALMA WORKS, PONDERS END, MIDDLX.
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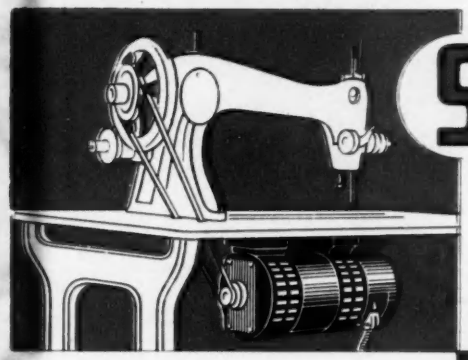


SEW-TRIC

SEWING MACHINE
MOTORS
1/15 H.P. A.C./D.C.

Motor started and controlled by light pressure on foot control pedal, leaving both hands free. No fatigue.

Needle light fitted on motor to relieve eye strain.

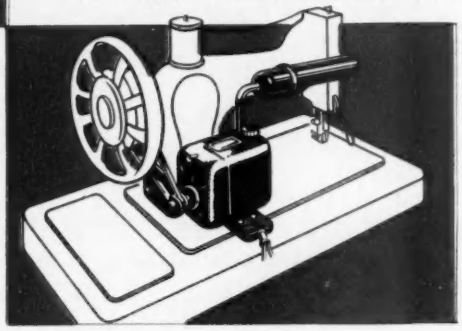
Running cost negligible. Retail price £5 14s. plus 25/4 P.T.

"MONOBLOCK" Trade Sewing Machine Motor.
Entirely new design.

Motor started and controlled by light pressure on treadle. Ferodo brake stops sewing machine instantly, when pressure on treadle is released.

Ideal motor for dressmaking, tailoring, glove, hat, fur trades, etc. Low current consumption.

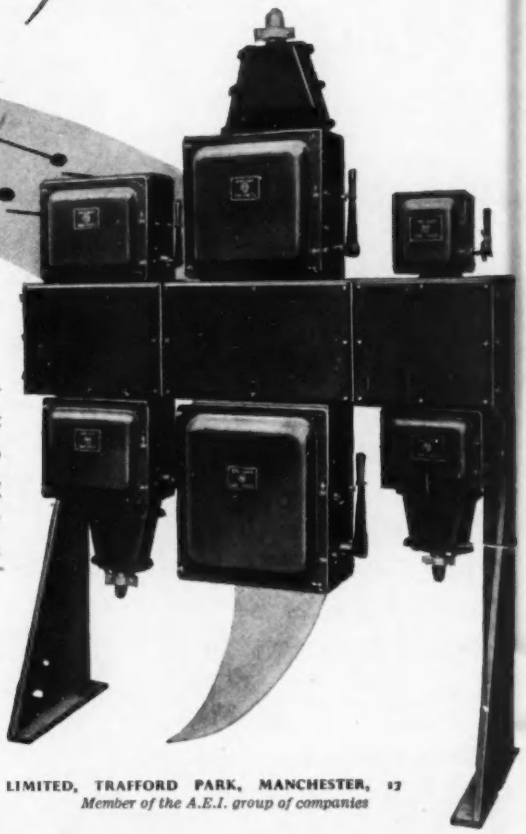
Retail price £8 5s.



SEW-TRIC LTD
Sew-Tric House · Honeypot Lane · Stanmore
MIDDLESEX

This means METROVICK Type MC fuse switchgear

- Available from stock
- Standard Unit Construction
- Easily Assembled
- 3 or 4-wire A.C. up to 660 volts



Type MC Unit distribution boards are designed for controlling medium voltage power house and industrial systems. Their standard unit design means easy assembly with no drilling on site, and their sound engineering construction means a long trouble-free life. Full technical details and prices available on request.

METROPOLITAN-VICKERS ELECTRICAL COMPANY LIMITED, TRAFFORD PARK, MANCHESTER, 17
Member of the A.E.I. group of companies

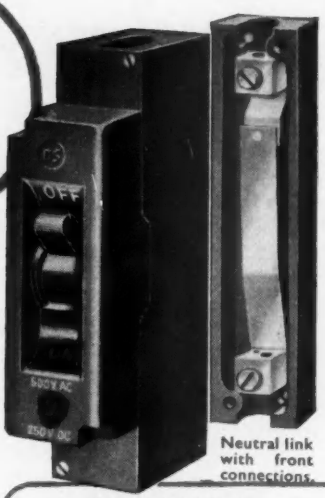
METROVICK *for all the Best in Switchgear*

F/V005

Introducing **DORMAN MINIATURE CIRCUIT BREAKERS**

TESTED BY THE NATIONAL PHYSICAL LABORATORY
Designed to give unfailing protection to all types of electrical circuits and equipment up to a maximum current rating of 50 amps at 500 V a.c. or 250 V d.c. On ordinary overloads tripping may be instantaneous or have an inverse time delay characteristic, but in all cases instantaneous tripping occurs on a large overload or short circuit. The mechanism is normally sealed to prevent interference with settings. Neutral mechanism designed as a separate unit, to be fitted underneath the main unit when required. Certified rupturing capacities 10,000 amp at 250 V d.c., 10,000 amp at 440 V a.c. at pf. 0.62 lag.

Write for illustrated folder M.C.B.



Neutral link with front connections.

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5" Length x 1⅝" Width x 3" MAXIMUM PROJECTION

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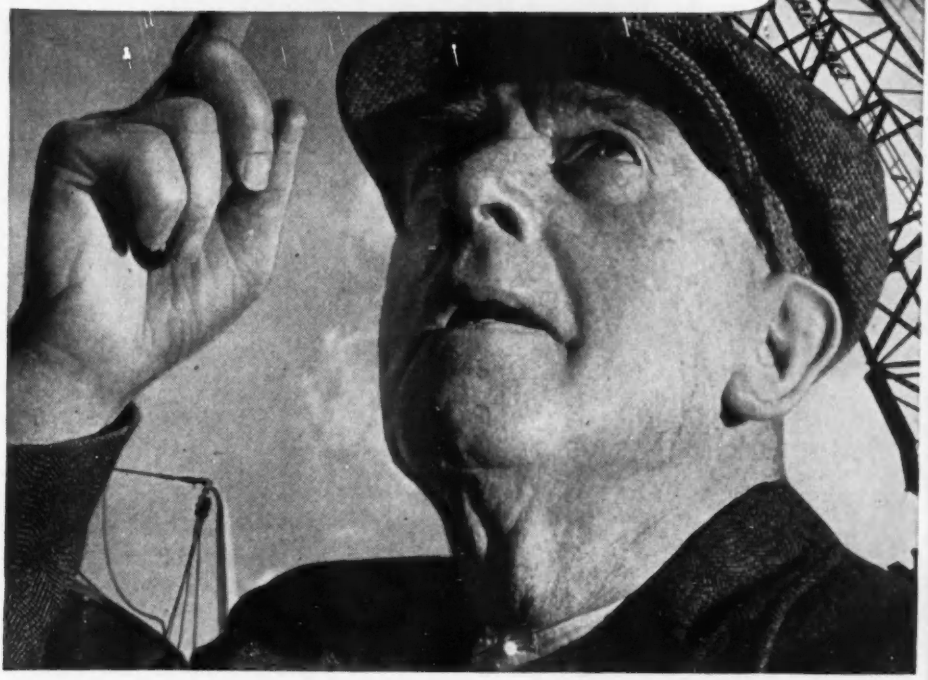

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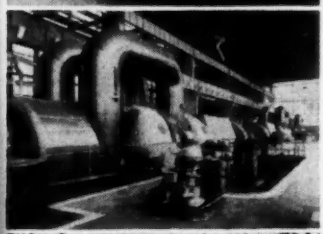
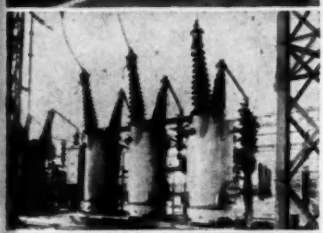
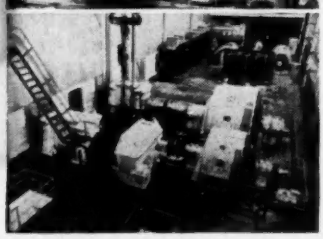

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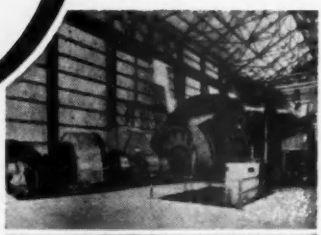
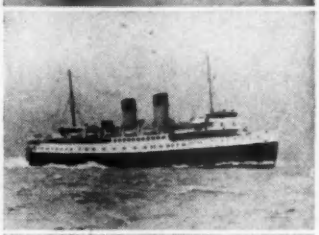

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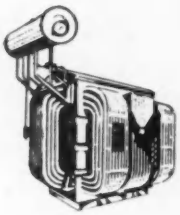

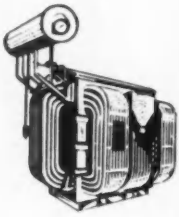

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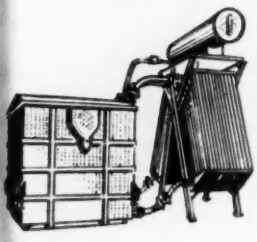

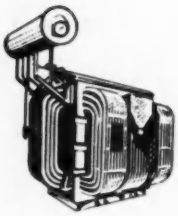

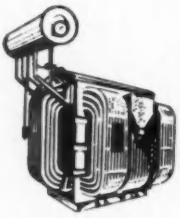

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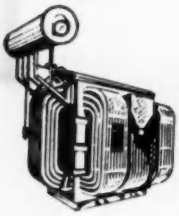

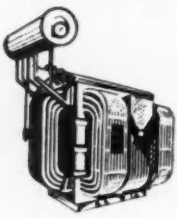

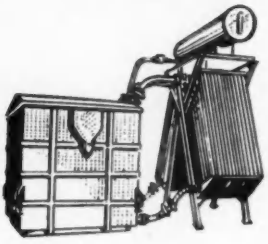

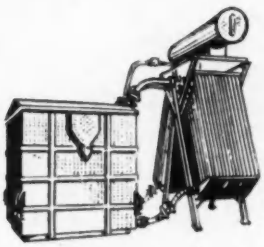
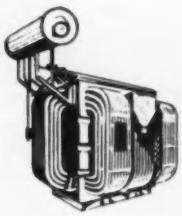
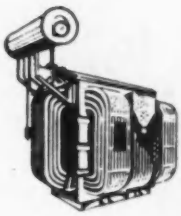

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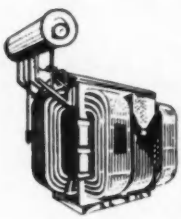
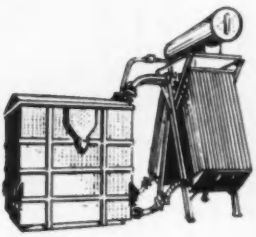
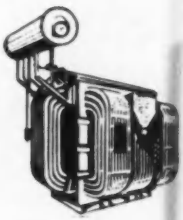

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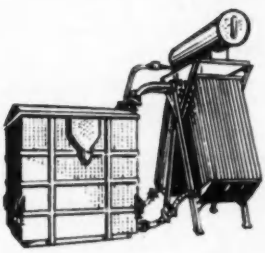
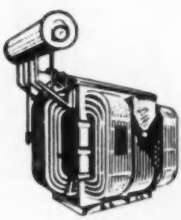
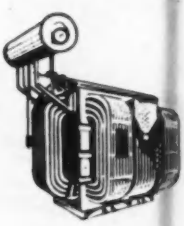

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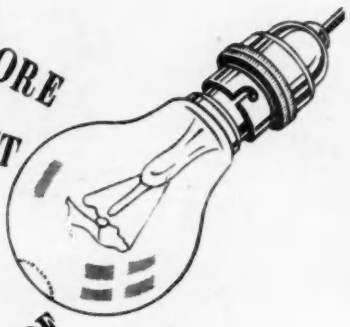
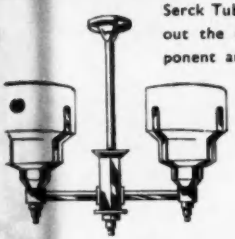


Serck TUBES



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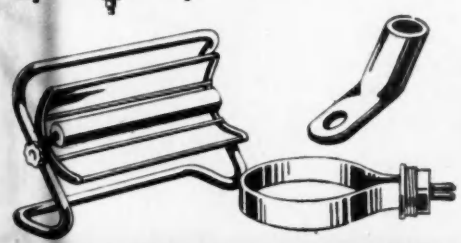

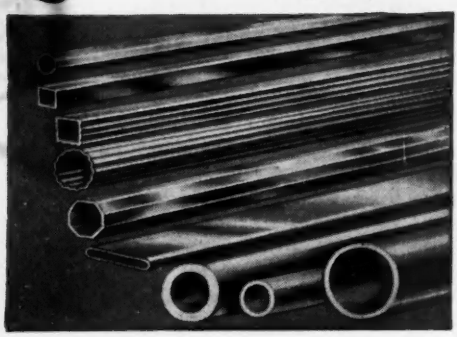

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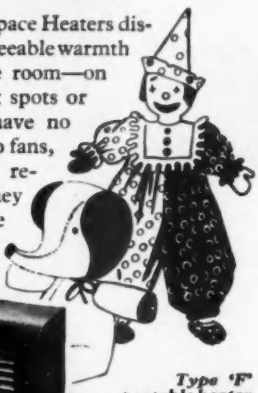

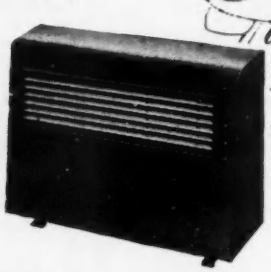

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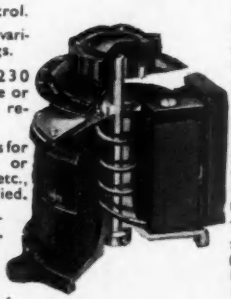

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Single or duplex voltage outputs. (Type 100 RM/2B).

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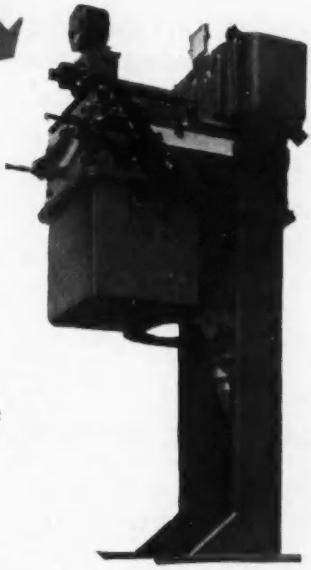

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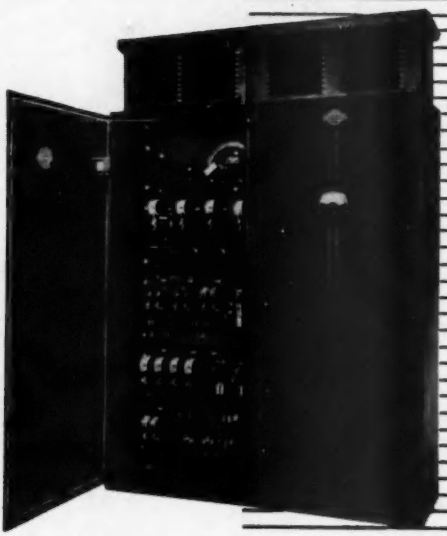

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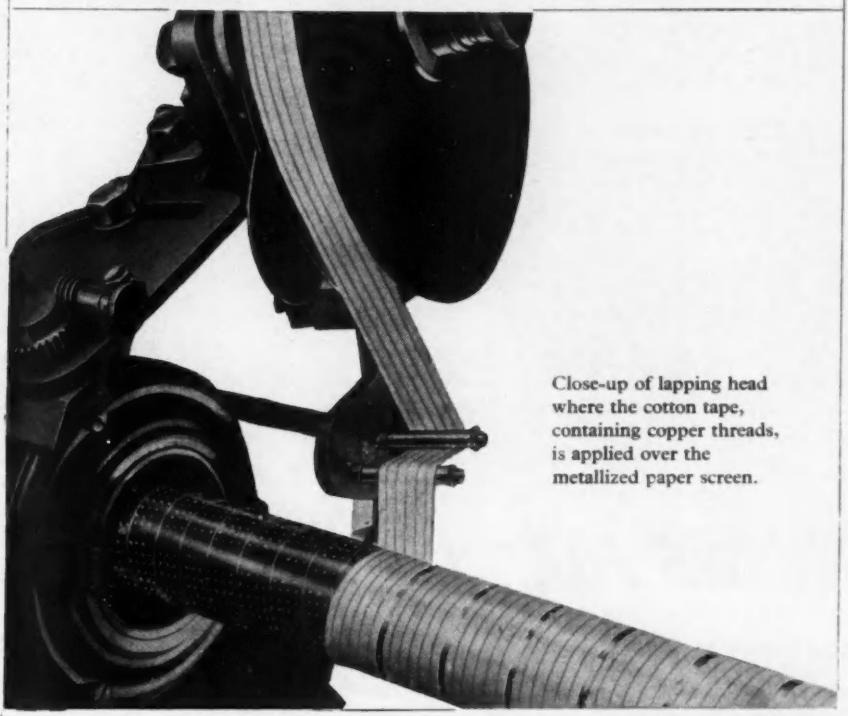

Close-up of lapping head where the cotton tape, containing copper threads, is applied over the metallized paper screen.

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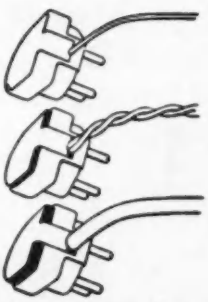

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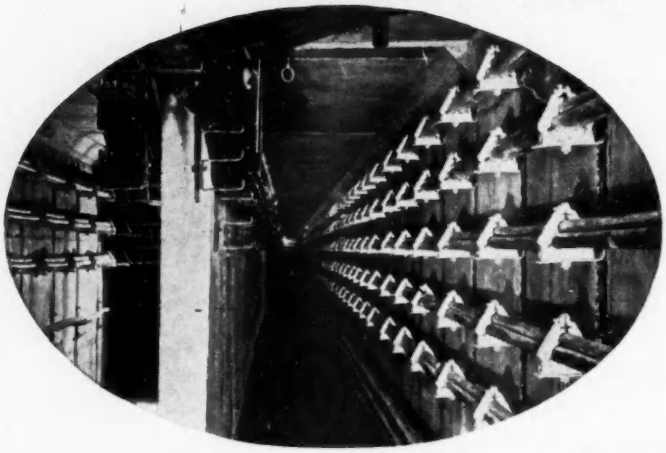

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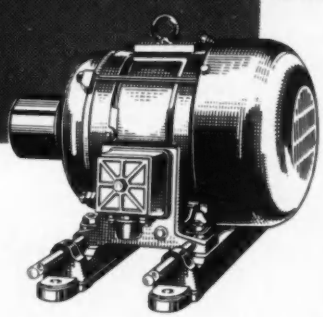

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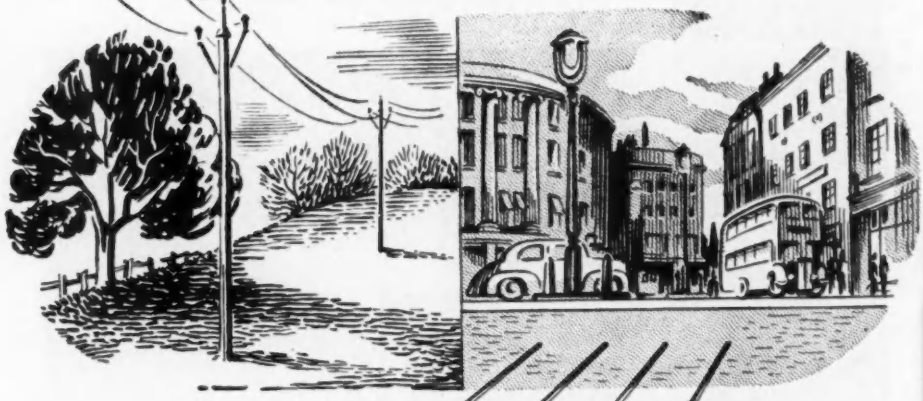

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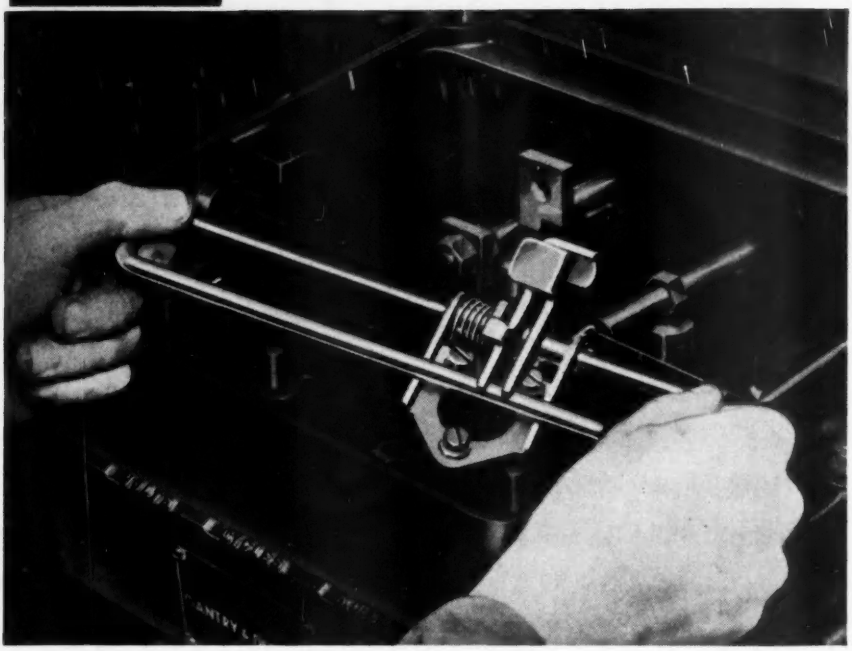

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ELECTRICAL TIMES

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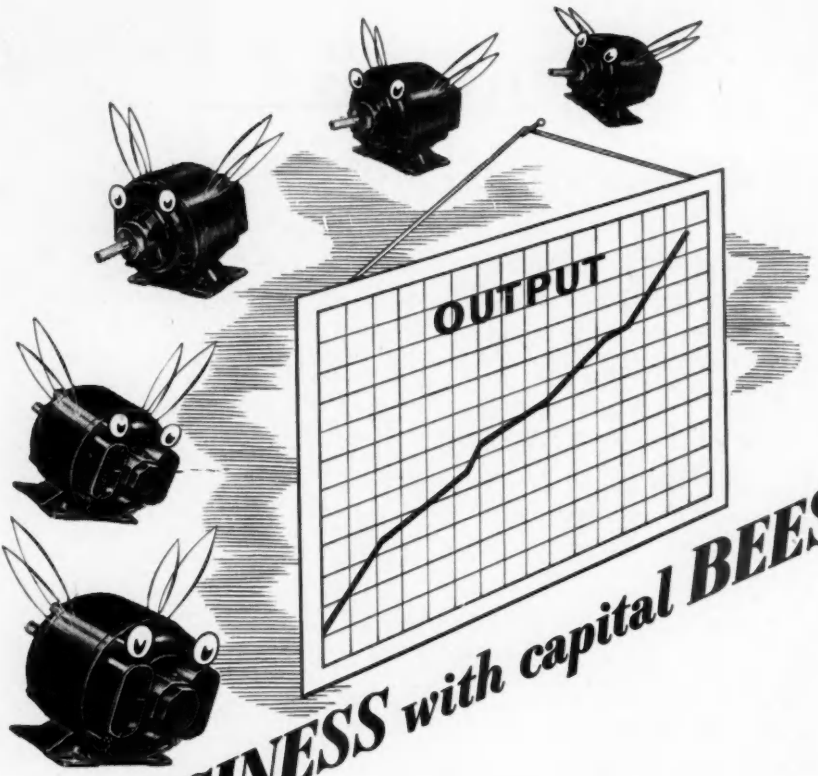

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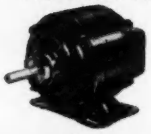

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Editorial

PROSPECT

POWER shortage is a world phenomenon, it is the major characteristic of the present phase of our industrial civilisation. Even in the U.S. there is difficulty in equating new plant to growing demand, while in many countries, such as our own, the end of power shortage is not yet in sight. Ostensibly the cause lies in the backlog from the sterile war years, but even with the present restrictions on electricity usage, so close has become the relationship between manufacturing capacity and world requirements that it is pertinent to ask whether balance will ever be obtained without a new concept in the building of power stations. In the long term, shortages provide their own solutions. Therefore, will the next decade or two see the dawn of a new technical era with original and more powerful sources of electricity? Whence can they come? Atomic energy, the fuel cell, or even a new medium of heat transfer; all seem far off at the moment, but it is on these lines engineers must think if the future is to be safeguarded. But whatever the solution, it must provide power units of greater capacity than at present. This is the corner stone of the difficulty; the individual size of the components of our new stations is inadequate when assessed against future requirements. Whether from new sources or old, only with larger power units and with transmission systems to correspond, can there be any prospect of balanced conditions of supply in the future.

FASTER GROWTH

BACKGROUND to today's power situation is sketched in by the newly available generating figures for the first six months of 1951. These show that the previous advance in the rate of increase of energy generated continues: the 30·8 million kWh generated in 1951 up to the end of June was 13·4% greater than for last year. It is true that so far this year has been colder than its predecessor, but corresponding percentages for 1950 and 1949, which are 10·2% and 5·7%, suggest that the increase is basically real enough. Taking these three years, there has been an overall increase of about 32% of the January to June, 1948, total. Plant capacity has not kept pace with this increase, and even less with the true demand, unaffected by peak load difficulties and fuel shortages. The extra energy has been generated by reason of better availability and utilisation of plant whose installed capacity at m.c.r. has risen only by 17·8% in the corresponding period. The effect of greater efficiency in operation is also apparent in the coal statistics, for an increase of 32% in units generated in steam stations has been achieved with only 25% more coal. Certainly, the figures show no signs of impending saturation, and it seems economically safe to plan ahead with no limitation on that account.

A NEW LIGHT SOURCE

THE advent of the "luminous capacitor," described elsewhere in this issue, as a source of light can be regarded in either of two ways. To the severely practical, electroluminescent sheet will seem of little immediate interest. The intensities obtainable are too low for it to be regarded as a practicable main illuminant and its application would, at present, seem to be restricted to secondary or decorative effects. It is, furthermore, not yet manufactured in Britain, and the present outlook for that industry will preclude developments of materials not having a strictly utilitarian application. On the

other hand, it represents—to the general engineering world at least—a completely new method of transforming energy from one form to another and, as such, is an event of some importance. While neither its brightness nor its efficiency are as yet impressive, neither were those of the Geissler tube, forerunner of the modern discharge lamp, and it may well be that Sylvania's first demonstration of the phenomenon of electro-luminescence on an appreciable scale, may yet be regarded as a milestone in the history of illumination.

MORE RESEARCH NEEDED

PRACTICAL development will not be possible without a considerable amount of additional work which will start, not in the factory or even in the laboratory, but on the scratch-pad of the theoretical physicist. For, although results have been obtained, the actual mechanism of electro-luminescence is but imperfectly understood, as yet. Until it is, no significant progress can be anticipated except by sheer luck—and luck plays a very small part in modern research. The popular idea of the development of, say, fluorescent powders, by a trial-and-error method, does not occur in practice. As Sir Henry Tizard reminded us a week or so ago, opening the new Simon-Carves research laboratories, to attain the highest qualities one is often forced to turn to research of an absolutely fundamental character. This is a case in point.

STANDARD AMENDMENTS

THAT severely utilitarian publication of the British Standards Institution, the Monthly Information Sheet, can hardly be classed as exciting reading, but *Meteor*, in his necessary perusal of successive numbers, has found some degree of fascination in one section. It is the list of amendment slips, each changing in some way an existing standard specification. The present series began in 1942 and is now past the 1,100 stage, so these amendments are issued rather more frequently than new standards. What fascination it is to search for a reason for their appearance. Standards are the result of an intensive co-operative effort, and even after agreement has been reached in committee a draft of the proposed publication is exposed to the criticism of all who may be interested. So the document produced might well be expected to be final; yet there is often an amendment to note within the next few years. Many of these, of course, have simple explanations—that old enemy of all who write or codify, the misprint; some subtle and unappreciated ambiguity of title or wording—but there are others that go deeper. The practice of the B.S.S. in keeping its standardisation committees in active being ensures that note can be taken of such matters, and the appearance of the amendments proves that any standard is a living document, still meeting the needs of its users.

Meteor

THIS WEEK'S PHOTO

KEADBY power station, one of three under construction in the Yorkshire Division by the British Electricity Authority, adjoins the Stainforth and Keadby Canal, seen in our photograph. Consent was granted and directions given for the building of the station in November 1947, and work actually began on the site in January 1948. The station will have an ultimate capacity of 360 MW, comprising six 60 MW Parsons turbo-alternators and six 550 klb/hr Stirling single drum p.f. boilers, operating at steam conditions of 900 lb/sq in, and 900° F at the turbine stop valves. There are five stages of feed heating, with a final water temperature of 386° F. The plant is arranged on the unit principle, each of the six turbo-alternator/boiler installations being self-contained. The first stage consists of four sets and four boilers, the initial unit of each being due for commissioning this year.

Total area of the site is 181 acres, of which the station proper occupies about 4½ acres. As the strata consist of silt, sands and peat, to a depth of about 40 ft, which overlie Keuper marl, the heavy structures have had to be supported on reinforced concrete piles.

Coal supplies will be rail-borne, there being a direct connection to the main Doncaster-Scunthorpe line, and extensive coal sidings will have a standage of approximately 650 wagons. Cooling water is derived from the River Trent. Ash will be pumped to an area at the western end of the site.

The building of Keadby power station has been undertaken through both the design and construction stages entirely by the headquarters staff of the B.E.A. under Mr. V. A. Pask, chief engineer. The main consultants are Ewbank and Partners, the civil consultants being Sir William Halcrow and Partners.

ELECTRICAL TIMES POWER STATION SERIES
No. 74 Keadby.

Luminous Capacitors

A New Light Source Based On Electro-Luminescence

METHODS of transforming one form of energy into another in the most simple and direct fashion are of major importance in the world of today, and one of the most important is the transforming of power into light. The first—and still the most widely used—method is that of raising the temperature of a body to incandescence, as in the filament lamp. Another important method involves the excitation of radiation by passing an electric current through a gas or vapour as in, for example, the mercury and sodium vapour lamps, or, with the addition of fluorescence excited by ultra-violet radiation, as in the fluorescent lamp.

A third method, known as electro-luminescence, involves the direct transmutation of electrical energy into light without the intervention of either incandescence or gaseous discharge phenomena. In brief, it consists of the luminescence of a phosphor under the influence of a rapidly changing electric field. It is at present under intensive research in the laboratories of Sylvania Electric Products Inc., of America, who have produced "lamps" in the form of translucent sheets, coated with a layer of phosphor combined with a dielectric between two conducting layers, thus forming, in effect, a luminous capacitor to which they have given the name "Panelite."

At the moment, the practical applications of this material, shortly to become commercially available in the U.S., seem limited by the low brightness so far obtained. Nevertheless, as a method of direct transformation of electrical energy into light it is considered of fundamental importance.

*Principles of Operation**

When certain materials are placed in a fluctuating electric field under proper conditions they are excited to luminescence and continue to emit light as long as the exciting field is maintained. This phenomenon of electro-luminescence is not to be confused with cathodoluminescence, since no intermediate phenomenon such as a glow or arc discharge appears to be involved. The materials

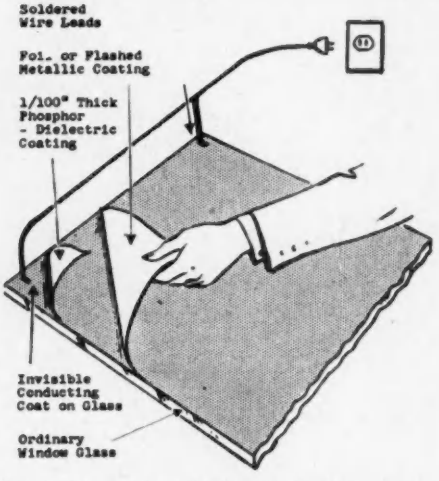


Fig. 1. Composition of "Panelite" electro-luminescent sheet

luminesce directly under the influence of the electric field which must, however, be in the process of changing in intensity. This phenomenon has been described by Destriau, and discussed more recently by Leverenz, whose experience, however, appears to have been rather discouraging. Results which, on the other hand, Sylvania have obtained leave no doubt regarding its existence—in fact, light intensities have been achieved which are adequate for many practical applications.

Electro-luminescence may be produced through a device which comprises a film of phosphor dispersed in a dielectric and placed between two conducting plates. At least one of these plates preferably should be light transmitting in order for the light generated to emerge. Such a device may be regarded as a luminous capacitor.

* Abstract of article by ELMER C. PAYNE, ERIC L. MAGER, CHARLES W. JEROME, and DR. E. F. LOWRY, of Sylvania Electric Products Inc.

Construction

A coating of phosphor suspended in a suitable solid dielectric is spread uniformly over the conducting surface of so-called "conducting glass." The surface of this phosphor-dielectric film is then coated with a metallic conductor such as vaporised aluminium, except for a narrow strip around the edge of the plate. Suitable connections are then made to a contact strip along one edge of the conducting glass and to any convenient spot on the metallic backing layer (Fig. 1).

A number of phosphors have been found which can be excited to a greater or less degree in this manner. Some are also fluorescent under ultra-violet or cathode ray excitation, some are phosphorescent, and some are neither. No direct correlation has been observed between the luminescence of a phosphor excited by the electric field and that resulting from ultra-violet or cathode ray excitation.

Operation

The emission of light in this manner is contingent upon a fluctuating field intensity. A brief flash of light may be observed when a d.c. potential is applied to the plaque and another when the charge is permitted to leak off, but no

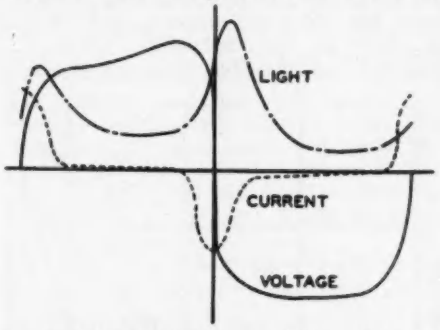
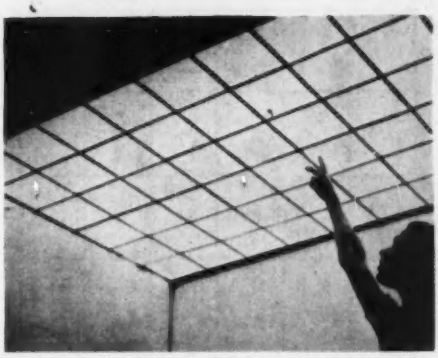


Fig. 2. Relationship between light output and rate-of-change of applied voltage

light at all is emitted as long as the d.c. potential is maintained. This is shown in Fig. 2, which shows the light emitted under a square wave input. It is obvious that luminescence occurs when the potential is changing, short bursts of light being emitted which are practically in phase with the voltage changes at the end of each half cycle.

Similar tests were run using a 60-cycle sine wave source of supply, and recording the phase relationships between voltage, current, and luminescence, as shown in Fig. 3, which demonstrates that the light emitted is in phase with the power absorbed by the dielectric. It is also apparent that the current leads the voltage by nearly 90°. Most of the luminescence occurs when both voltage and current are in the same direction although in different quadrants, this, of course, being the period when the capacitor is absorbing energy. Very little light is emitted when voltage and current are in opposite directions. In other words, the light emission is in phase with the positive half of the power curve.



Ceiling made of electro-luminescent sheet, with a brightness of 2½ ft.-lamberts. Illumination on model approx. 1½ ft-candles

Effect of Voltage

Several factors affect the intensity of the light emitted. The thickness, the resistivity, and the dielectric constant of the phosphor

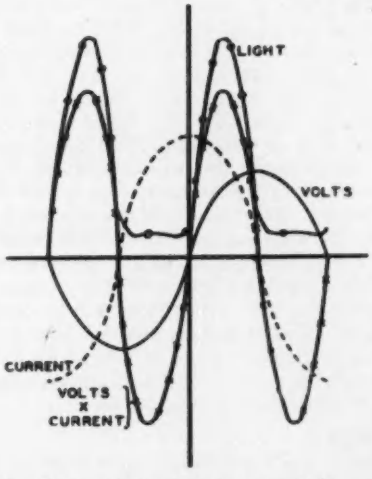


Fig. 3. Phase relationships between light output, voltage, current and volt-amperes

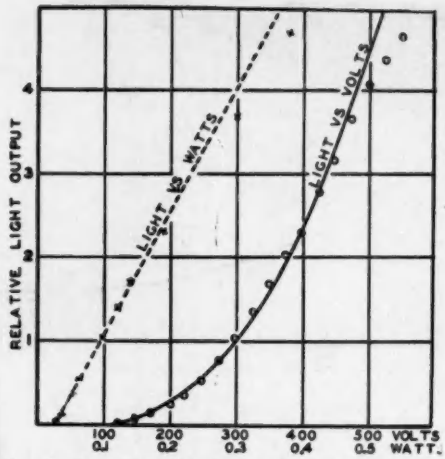


Fig. 4. Variation of light output with voltage and electrical power

layer are all important, as are the voltage and frequency at which the device is operated. Fig. 4 illustrates the relation between light output and voltage for a typical luminous capacitor operated at 60 c/s. The threshold of visibility is at a potential of the order of 25 volts, and the brightness increases rapidly with the voltage over a considerable range until a limiting value is reached, at which breakdown of the dielectric occurs.

At a given voltage the light output increases with frequency as shown in Fig. 5, Curve A, showing results with a constant voltage of 100 volts, the frequency being varied between 50 and 3,500 c/s. There is some discrepancy to be accounted for in the neighbourhood of 50 cycles, possibly due to some resonance effect in the generating equipment, but with this exception the light output increases with frequency. Curve B of this figure is of equal interest and of some theoretical significance. This curve shows the relation between light output and wattage consumption at different frequencies. The linearity of this relation over nearly the whole range of frequencies suggests that a given amount of light is emitted each time the capacitor lamp is charged to a given potential or, in other words, each time a given quantity of electricity is stored. The more times per second this is accomplished the more light will be emitted. This, of course, agrees well with quantum considerations.

Theory

These results differ from those reported by Leverenz who performed some experiments with phosphor films furnished him by Destriau as well as with phosphor films prepared in his own laboratories. He states that these films were found to glow feebly blue (barely perceptible to the partially dark-adapted eye) under applied 110-volt alternating current, and believes that this glow is that characteristic of breakdown ionisation of atmospheric nitrogen on the assumption that the electric field may produce a breakdown of thin air films surrounding the phosphor particles in the organic film.

Whatever may have been the situation in the experiments performed by Leverenz, the results which have been obtained prove that his conclusions are not applicable to the devices described here. If the light obtained from these lamps were associated with glow discharge phenomena, it should be even more intense on d.c. than on a.c. whereas there is no light emitted at all on sustained d.c. potentials of the same value as the a.c. voltages used. All phosphors capable of being excited by ultraviolet should emit some light of their characteristic colour. Only certain phosphors exhibit electro-luminescence. If glow discharge phenomena were responsible, the luminosity should be in phase with the current. It definitely is not. The lack of a glow discharge in these lamps is also evident from the fact that the current leads the voltage by a large phase angle. Furthermore, the higher the dielectric constant and resistivity of the medium in which the phosphors are embedded, the greater the light

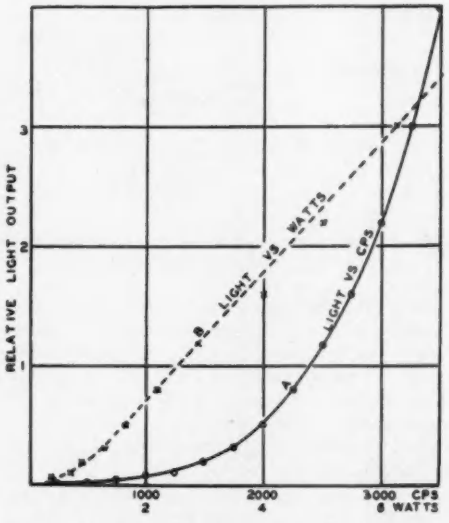


Fig. 5. Variation of light output with frequency and wattage

intensity at a given voltage or, conversely, the lower the voltage at which a given luminosity may be obtained.

An explanation has been advanced by Garlick that light emitted under field excitation is a phosphorescence resulting from the lifting of electrons from deep traps. This explanation may have some theoretical merit although it seems rather difficult to visualise in view of the fact that in some of the experiments lamps which had been kept in complete darkness for as long as three days luminesced at normal brilliance immediately upon application of the proper voltage. Other luminescent (condenser) lamps have been operated continuously in a light-tight box for as much as 16 hours with no appreciable diminution of their light output. In this latter case, the phosphorescence must have been self-excited if the explanation referred to is accepted.

The useful life to be expected from these lamps has not yet been fully determined although some of them have now been in operation for some thousands of hours. After about 50 hours of operation, their light output seems to flatten off and remain fairly constant over considerable periods. Further data on both points are being accumulated.

Colours

It is interesting to note that no perceptible colour change takes place on dimming, but that a very definite colour change has been observed with variable frequency operation. For example, a luminescent (condenser) lamp which luminesced in the yellow green at 60 cycles had a pale blue-green colour at 3,000 cycles. No explanation for this behaviour is advanced although it may well be due to different decay rates of the phosphor components.

Spectral energy curves for blue and yellow electro-luminescent lamps are shown in Fig. 6.

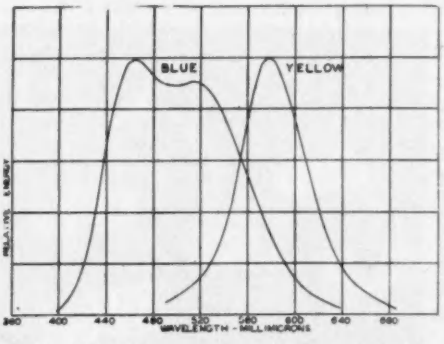


Fig. 6. Spectral energy curve for blue and yellow luminescent sheet

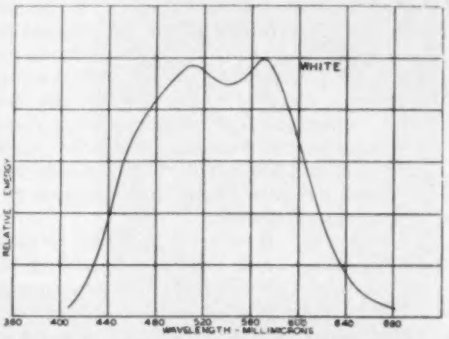


Fig. 7. Spectral energy curve for white lamp combining blue and yellow of Fig. 6

By combining these two colours in proper proportions white lamps may be made which have spectral energy curves like that shown in Fig. 7. The colour emitted by these lamps depends on the particular phosphor which is used. In general, these are of the zinc sulphide type but require special formulation and special methods of processing to make them respond satisfactorily to this new form of excitation. The usual types of phosphor such as used in fluorescent lamps and television picture tubes do not respond appreciably to this new method of excitation.

Brightness and Efficiency

Green Panelite lamps have a brightness of about 0·1 footlambert at 120 volts 60 cycles and from 3 to 5 footlamberts at 600 volts. At 400 cycles brightness levels several times as high as these may be obtained.

At present the efficiency of these lamps is only a few lumens per watt, a large part of the energy consumed being taken up by dielectric losses which do not contribute to the light emitted.

Applications*

It is felt that Panelite will eventually take its place as a major light source since it is the first available completely uniform surface, there being no limit—other than handling or transporting—to the size of glass or translucent plastic surface so treated, while its coolness is also a noticeable feature, the temperature rise being negligible. It is visualised for applications which fall into four major classes: (1) visual recognition by dark-adapted eyes;

* Abstract of article by R. G. SLAUER (Manager, Applications Laboratory) of Sylvania.

(2) decorative lighting effects for normal interiors; (3) luminous panels unhampered by heat, poor uniformity or a third dimension due to lamp boxes; (4) light for normal seeing purposes. Detailed suggestions in the first three classes include dials and faces for clocks and instruments, viewing plates for transparencies, accident prevention markings and signs, and luminous panels for incorporation in structures or furniture.

Commercial development is at present limited to two types which can be utilised for at least the first three classes. One type presents a green luminosity at 0·1 footlambert (the brightness of a white object in full moonlight)

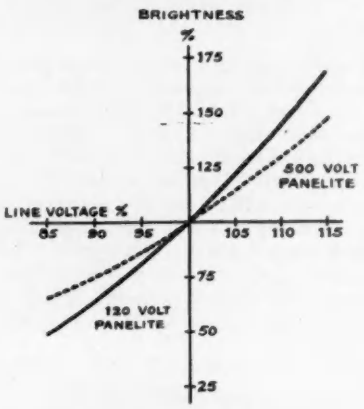


Fig. 8. Variation of brightness with small change in mains voltage

when the lamp is connected direct to the usual 120 volt, 60 cycle circuit; the second, a green luminosity not over 2·0 footlamberts when a 500-volt step-up transformer is made part of the circuit. Coloured light at two footlamberts brightness would be quite noticeable in any interior lighted up to 5 or 8 footcandles—thus including most rooms in the home, amusement places, lobbies of certain buildings, and similar areas where lighting for critical vision is either not required or provided only in localised areas. The primary difference between these two commercially available Panelites lies in the thickness and character of the dielectric used since, as with any condenser, there must be a safety factor against surges and line fluctuations. The current rating of 120 V Panelite is about 8 mA per sq ft, at 500 V about 15 mA.

The spectrophotometric curve of the green Panelite shows a rather saturated colour peaking at 5,200Å. If energy can be supplied

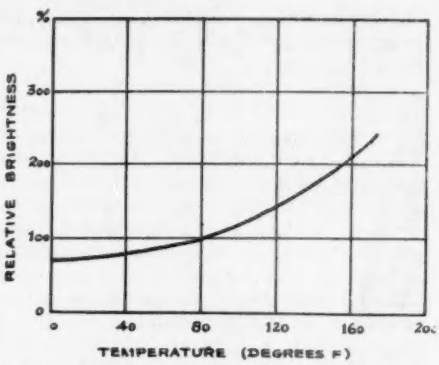


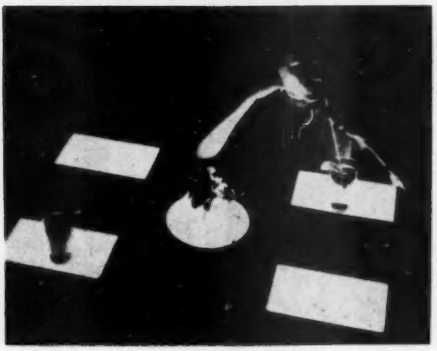
Fig. 9. Variation of brightness with temperature

at higher frequencies to a green Panelite, the brightness of the lamp would increase appreciably (about 12-fold at 3,000 cycles) and the colour would shift somewhat to the blue. While it is not anticipated that there will be many applications at such high frequencies, it can be noted that 400 cycles is standard for many airplanes and that frequency conversion equipment is practical enough to be considered for limited lighting applications. Brightnesses around 25 footlamberts, especially in colour, are readily visible in almost any artificially lighted interior.

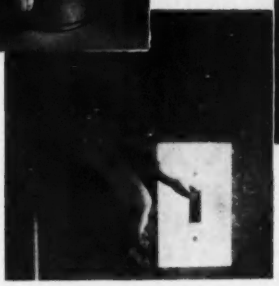
Voltage Variation

While lamp brightness varies appreciably as voltage is increased towards extreme values, the effect within probable commercial range is slight. For low brightness Panelites, a 1% variation in line voltage between 100 and 130 produces about a 3% variation in light output. For the medium brightness panels, the varia-

Ornamental table-top lighting by electroluminescent sheet, with loading of less than 3 W



Above: Self-illuminated radio dial employing electro-luminescent sheet



On right. Illuminated switch plate with consumption of 1/50 W

Above. Self-luminous clock face utilising electro-luminescent sheet

tion is somewhat less although this may depend as much on the transformer design as it does on the lamp (see Fig. 8).

Electro-luminescent lamps are currently being designed for operating ranges between −20° F. and +175° F. This is not necessarily a limiting factor; if applications arise which require a broader range, there is every reason to feel that satisfactory results can be achieved with proper dielectric and phosphor control. An indication of light output variation with temperature is shown in Fig. 9.

Electrical Characteristics

The electrical characteristics are quite interesting. It possesses a leading power factor—in some cases as much as 80 degrees leading (10% power factor). Very few operating devices on electrical power lines are in this category.

A small clock face (3 in. diameter) for 120 volt operation would be rated about 1/50th of a watt. Thus, operating continuously, it would not consume more than 0·2 kWh in power per year. The current rating for such a lamp—at 0·1 footlambert—is about 0·5 milliampere. A larger clock face (15 in. diameter) for 500 volt operation would operate at about 18 milliamperes. In general, it might be said that each square foot of 120 volt panelite would be rated at 8 milliamperes; each square foot of 500 volt panelite at 15 milliamperes. This is not necessarily a straight line relationship since there may be edge effects and some changes in phase relations because of the inductive and resistive elements of the transformer. Nevertheless, they are indicative of the power requirements for present applications. The capacitance of the lamp increases proportionally as its area increases assuming no change in details of lamp design—the small clock face noted above being about 0·01 microfarad, the larger one about 0·20 microfarad.

No rating on life has thus far been established but it is expected to be measured in years. Unless breakdown occurs, prevented largely by adequate design and evident only by minute black spots on the lamp face, life seems indefinite. Nevertheless, there is probably a chemical as well as other phenomena which affect brightness in service, and therefore, practical ratings may be set at one to five years. Moisture, of course, tends to accelerate chemical processes and can be a factor leading to electric breakdown so an anti-humidity coating over the entire lamp will add to its overall performance.

The application of this new light source is still in its early stages. Many of the details given above are illustrative only, correct for the product as now being made but subject to change and refinement, depending on variations between phosphors, between dielectrics, even between the types of glass being used. In any case, as more of these lamps are put into daily use, an interesting new path of lighting progress seems assured.

The Transport Commission's Report

Progress in Rail Electrification is steady

A DEFICIT of £14·1 million for the year 1950 is shown in the Third Annual Report of the British Transport Commission. This is mainly attributed to the fact that the Commission is unable to raise fares and charges immediately increases occur in working expenses on the prices of raw materials, but is compelled to wait until authorisation is given. It is estimated that these delays involved a loss of £11 million on railway and dock revenues and £4 million in the London area, on the Scottish bus services and on the road haulage services. It is claimed that as the cost of passenger services represents only 2% of the total national expenditure on personal consumption, any increases in the Commission's fares and charges cannot be regarded as a prime factor in inflation.

The Report further claims that the efficiency indices have improved generally, taking into consideration the general rise in prices. In order, however, to prevent stagnation or decay over a large part of the railway system, there must be a more adequate allocation out of the total national capital investment, and objections made by small sections of the public and staff to changes leading to greater efficiency must be avoided or eliminated. In order to avoid delays between increases in costs and increases in fares, a new system of approval is needed which should be more flexible and rapid.

New bases of charges were essential to the Commission's financial future; and it is proposed to introduce railway rates which will take into greater account the actual cost of different types of service. This new scheme is to be submitted to the Transport Tribunal some time in August this year (1951) and entails a complete revision of the General Classification of Merchandise; and the compilation of a gazetteer of chargeable distances based on road mileage.

Electrification

On the question of electrification, the Report has somewhat less to say than in previous years. The electrified Liverpool St.-Shenfield service has operated satisfactorily and attracted a heavy increase in traffic, passenger journeys having increased 48·5% over the 1949 figures and receipts by 40·8%. Work proceeded on all phases of the Manchester-Sheffield-Wath scheme, and the first stage, covering the Wath-Dunford Bridge section of line is due to be opened in 1951. A re-assessment of the electric locomotives required for the full scheme enabled a reduction to be made in the number required from the 85 originally contemplated to 65, which will consist of 58 Bo-Bo for mixed traffic operation, and seven Co-Co mainly for express passenger services. Twenty-four multiple-unit electric coaches required for suburban services in Manchester area have been built and the manufacture and erection of the electrical equipment was about 25% complete.

In August last year, the Executive completed an outline scheme for the electrification of the Fenchurch St.-Tilbury-Southend line, which was approved in principle by the Commission.

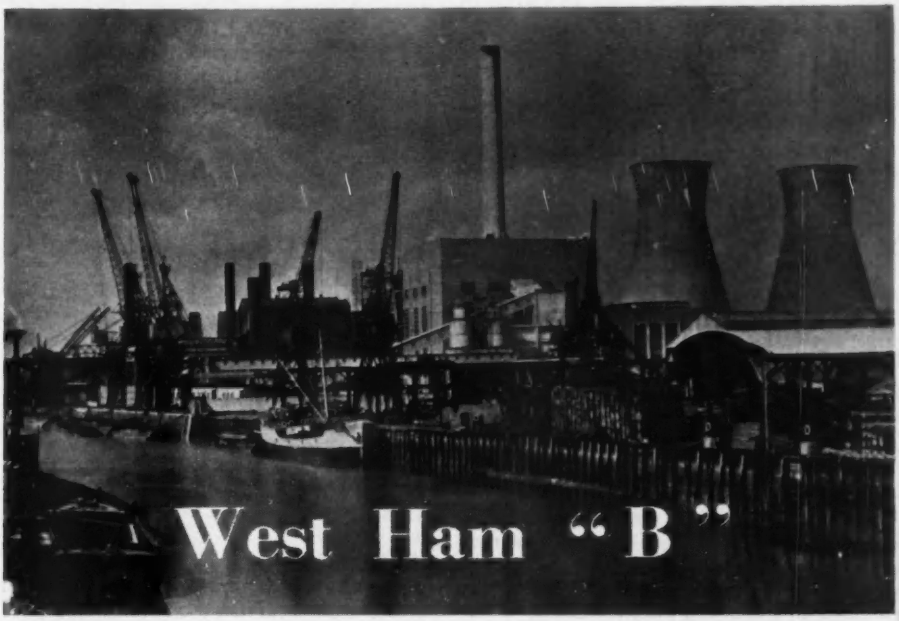
Restriction on capital investment led to the suspension of plans for constructing a number of 2,500 h.p. electric locomotives for main line services on the 660 V third rail system of the Southern Region. Work was also suspended on the provision of several 1,250 h.p. mixed-traffic electric locomotives for the same Region. These were to have been fitted with auxiliary diesel power to enable them to perform shunting on non-electrified lines.

Diesel Electrics

The two 1,600 h.p. main-line diesel-electric locomotives, 10,000 and 10,001, worked as a double unit operated passenger services on the Euston-Glasgow main line throughout the summer, and in the winter operated on fast freight services between London and Crewe. An experimental 827 h.p. loco, completed in June, 1950 entered regular passenger service in November between Derby-Kettering-Nottingham-Manchester, and in the Southern Region, the first of three 1,600 h.p. main line diesel-electric locomotives was completed toward the end of the year and began trial running.

The 2,500 h.p. Brown-Boveri gas-turbine-electric locomotive has been running on fast passenger service between Paddington and Plymouth or Bristol, and the 3,500 h.p. second gas-turbine loco being built by Metropolitan Vickers Electrical Co. Ltd. had reached an advanced stage by the end of the year.

Details are also given in the Report of the operation of the various Executives and comprehensive appendices outline the financial and statistical situation of the various sections.



West Ham "B"

NEW LONDON DIVISION STATION IS PLANNED TO HAVE ULTIMATE CAPACITY OF 180 MEGAWATTS

BOW CREEK, the tidal portion of London's River Lea, has had an electricity generating station on its banks since 1904, and the new West Ham "B" station, which was opened yesterday by Councillor W. W. Paton, J.P., Mayor of West Ham, was the fourth of its line when first envisaged by the West Ham County Borough Council. It is expected to have an ultimate capacity of 180 MW, reached in three sections each of 2 x 30 MW, but as the third section involves the scrapping of the 63·5 MW West Ham "A" station, it is unlikely to be carried out for some while.

The station site offers, in some degree, the conventional advantages of ready access by road, rail and water, of river water for cooling purposes, and of being at the centre of an industrial area. An additional recommendation is the proximity of a gasworks offering substantial quantities of coke breeze as a relatively cheap fuel and one whose efficient utilisation is in the national interest. Some of the advantages are less weighty than might appear at first sight, for the river water is insufficient in quantity to dispense with the need for cooling towers, and the river is too shallow to allow colliers to come to the station wharf: transhipment to lighters is necessary. However, on balance, the site is the most attractive in the area, and conditions during the war permitted the purchase of additional land extending the area available from nine acres to twenty-one.

Civil Engineering

Some difficulty was experienced in the preparation of the site for building, as much of the ground had at one time been used as a sewage farm, and remains of foundations were discovered at considerable depths: there was the added complication that standing water level is only a few feet below the ground. About 15 ft below ground there is a 6-10 ft layer of ballast.

Steel shortages at the time of construction led to the selection of a red brick for the superstructure, instead of the reinforced concrete originally planned. In the boiler house a portal system of construction has been adopted, because lack of space prevents cross bracing. Another result of space shortage is the effectively vertical disposition of plant in the boiler house, with chimneys, fans and dust extraction plant

The heading block shows a general view of the station from the coaling wharf. In the background is seen the old West Ham "A" station

located over the boilers. There is to be one chimney for each four boilers, the load being distributed to four main columns. The firing aisle of the boiler house runs at right angles to the shafts of the side-by-side turbo-alternators.

Height to the boiler-house roof is 120 ft, and to chimney top, 318 ft. The roof has an 18 ft-high parapet to screen the cyclones, etc. installed. The turbine house operating floor is of concrete, 25 ft above basement level. Adjoining the turbine house there is an 180 ft x 80 ft office block which houses the control room and the 11 kV switchgear. A bridge joins the two buildings.

Lifting facilities include an 80-ton crane in the turbine house and a 12-ton crane in the auxiliaries bay which separates the turbine house from the boiler house.

Coal and Ash Handling

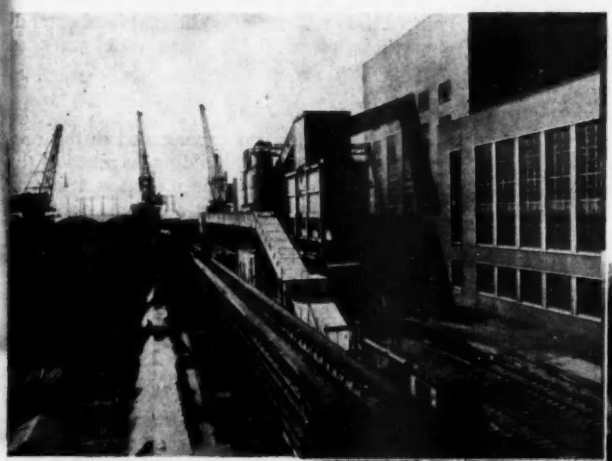
A main coal store with a capacity of 21,000 tons at 15 ft-deep stocking is laid out at the south-east end of the station site. It is served by a travelling bridge equipped with two travelling jib cranes and a conveyor belt. This unloads coal on to a conveyor running the length of the store (550 ft), which transfers it to a mixing bunker. It is taken thence via jigger feeders, to twin boiler-house conveyors, which discharge it into the 1,100 ton capacity reinforced high-density-concrete lined bunkers, one of which serves each pair of boilers.

River-borne coal is unloaded by two luffing jib cranes, which feed on to a wharf conveyor, and thence either to the mixing bunker or to the storing conveyor which runs along the coal store, and feeds its coal to the lower chord of the crane-bridge conveyor, whence it is distributed to stock. A wagon tippler is provided for rail coal, with another conveyor feeding to the mixing bunker, and plans are in hand for a further conveyor, eventually, bringing coke breeze directly from the gasworks.

Ash is sluiced from the hoppers of the stoker-fired boilers and discharged through clinker grinders to two sumps in the boiler-house basement. It is pumped from there to a 750-ton capacity bunker over the station rail siding, and it can then be discharged to railway wagons or lorries.

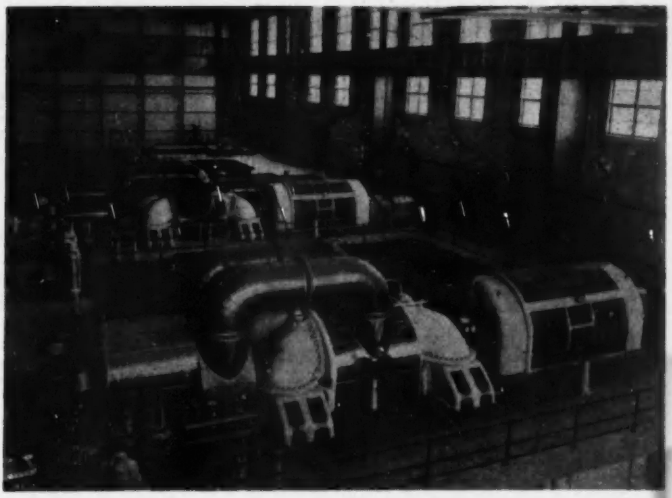
Boiler House

Four John Thompson "Radiant" type boilers, each with an economical rating of 144 klb/hr and an m.c.r. of 180 klb/hr, are installed at West Ham at present, but eventually there will be 12 such units. They are designed to burn small coal with a calorific value of



This view of the station shows the coal store, with the storing and reclaiming conveyors in the foreground. The dust cyclone and ash disposal hopper are also prominent in the picture

Local control panels for Nos. 1 and 2 boilers, seen here, are not used in normal running, one master controlling each set of four boilers



Four turbines will ultimately be housed in the first two sections of the turbine house, shown here. Turbine auxiliary control boards are set in the wall at one side of the turbine house, as shown, while to the left (outside the picture) is the bay for feed pumps, etc.

11,000-11,500 B.Th.U./lb (gross) and coke of 9,000 B.Th.U./lb, in a 4:1 to 3:1 mixture. Steam conditions at stop valve are 640 lb/sq in. (gauge) and 875° F, and the guaranteed efficiency when burning all coal is 85·5%, based on the higher calorific value.

International Combustion twin "L"-type Underfeed chain grate stokers are installed, fuel being fed on to them by two traversing chutes. The air heater is a tubular John Thompson design, with cast-iron tubes at the low temperature end to minimise corrosion. A Green gilled-tube type economiser is fitted, while the superheater is of the convection type, with a contact-type interstage desuperheater to maintain the final steam temperature at 875° F. Each boiler has two i.d., two f.d., and two secondary draught fans, all by James Howden and Co. Dust in the flue gases is removed by Howden multi-cell separators immediately before the gases enter the i.d. fans.

Automatic boiler control on the Hagen pneumatic system is installed, each set of four boilers being controlled from a single master regulator. Selected indicators from the control panels are repeated in the combustion engineer's office.

Turbine House

At present, two of the eventual six 30 MW turbo-alternators are installed, and foundations, etc., are being prepared for the next two. The machines are English Electric 2-cylinder units, with an economical rating of 24 MW. The h.p. section has 20 stages of impulse blading, and each section of the double-flow l.p. cylinder, 10 stages of reaction blading. Twin shell condenser of a 3-pass design are used, giving a vacuum of 28·5 in. mercury at m.e.r. when the circulating water flow is 18,000 g.p.m. at 70° F. At m.c.r. the water flow is 21,000 g.p.m. For each machine, two main ejectors are provided (one a stand-by), one quick-start ejector, and two condensate extraction pumps.

Steam is bled for feed heating at four points, giving a final feed temperature of 340° F. Drysdale feed pumps are used, the ultimate installation planned being seven electrically-driven 345 klb/hr units and three steam turbine-driven 360 klb/hr units. At present, three electric and two steam pumps are available. On the first two turbines, steam is also bled-off for two unit evaporators, each with a capacity of 5·5 klb/hr at economic rating. Evaporator feed is town water softened by the cold lime-soda process in a Kennicott plant.

The alternators are designed for wattless currents from 22·5 MVAr lag to 11·25 MVAr lead. With cooling air at 104° F circulating water from the main condenser is used for air cooling. Generation is at 11 kV, and the alternators have directly-driven main and pilot exciters.

Cooling

As has been stated, water available in the River Lea is insufficient for direct cooling, and so three 2·8 m. gallons/hour reinforced-concrete cooling towers, each 230 ft high, are planned for the completed stations: two are at present installed. At a dry bulb temperature of 57° F, and with 70% humidity, they are designed to

General view of the station control room which also deals with the feeders used for local distribution at 11KV

cool the circulating water from 82·5° F to 70° F. Carry-over is suppressed by film eliminators fitted about 6 ft above the main irrigation stacks.

Make-up water is taken from the River Lea at times of high tide. Three 2,700 g.p.m. W. H. Allen centrifugal pumps, driven by 32 h.p. s.c. induction motors are installed for this purpose. The main circulating water pumps, of which there are three, are also by W. H. Allen, and are 23,700 g.p.m. units, powered by 550 h.p. direct-on-line starting induction motors. Provision is made for automatic chlorination of the circulating water.

Control Room and Protection

A double busbar system is installed at the station, with the busbars normally in two sections, interconnected by a 15% (on 30 MVA) reactor. At present there is one set on each bar. The 11 kV switchgear (Reyrolle) is rated at 750 MVA breaking capacity. Monobias busbar protection is provided.

Many local distributors are controlled from the station control room which is, in consequence, rather larger than usual. These feeders are connected to the busbars through 6% (on 33 MVA) reactors, which permit the use of 350 MVA breaking capacity switchgear.

3 MVA unit transformers are teed-off solidly from each alternator, and supply essential auxiliaries at 3 kV, with local step-down transformers for 440 V supplies. Non-essential supplies are taken from two 5 MVA 11 kV/3kV station transformers. All these transformers are B.T.H. units, and the auxiliary switchgear is English Electric.

Transmission away from the station is at 66 kV, and two Johnson and Phillips 30 MVA delta/star transformers are installed to step up the voltage. On load tap changing for $\pm 7\frac{1}{2}\%$ is provided on the h.v. side. Cooling is ON/OFF, the natural oil cooling sufficing up to half full load. When the second section of the station is completed, there will be two further 11 kV/60 kV transformers, the two alternators concerned being switched at the higher voltage.

Contractors

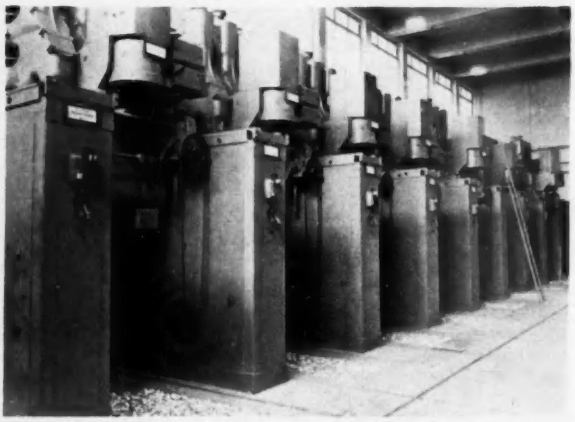
Consulting engineers: Merz and McLellan.

Steam raising plant: John Thompson Water Tube Boilers; Boiler control, James Gordon and Co.; Fans, James Howden and Co.; Economiser, E. Green and Sons; Feed Water Control, Copes Regulators; H.P. Valves, Hopkinsons, Ltd.; Mechanical Stokers, Underfeed Stoker Co.

Turbo alternators: English Electric; Evaporators, G. and J. Weir; Pumps, Drysdale and Co.; Water treatment plant, John Thompson Kennicott.

Circulating water: Cooling towers, J. L. Kier; Pumps, W. H. Allen Sons and Co.; Chlorination, Paterson Engineering.

Main switchgear: A. Reyrolle; Auxiliary switchgear, English Electric; Cables, S.T.C. and Co.; Transformers, B.T.H.; Batteries, Hart Accumulator Co.; Lighting and heating, W. J. Furse and Co.



11 kV switchgear, seen here, is housed in the office building

International Illumination Conference

Britain well to the fore at the C.I.E.

From Our Special Correspondent

THE twelfth session of the Commission Internationale de l'Eclairage opened in Stockholm in the presence of King Gustav, and was attended by some 450 delegates from twenty-two countries, coming from as far afield as Australia. Great Britain was represented by 66 delegates under the leadership of Dr. S. English.

The last meeting of the Commission was in Paris in 1948. The period between meetings is normally three-years, but it has been decided that a three year period is not sufficient to collect new information on certain subjects and the next meeting is planned for 1955, in Switzerland. On the other hand, there are some rapidly-moving subjects such as television for which a four year period is too long to have to wait for a further report and in such cases it is possible that intermediate meetings will be held.

The purpose of the meetings of the C.I.E. (the previous initials I.C.I., which were an abbreviation of International Commission on Illumination, have been officially dropped for obvious reasons) is to enable people from various countries to meet and exchange information both at and away from the technical sessions.

British Achievements

The secretariat reports prepared by the responsible countries included reports on progress in light sources, lighting practice, signals, photometry, colorimetry, airfield and aircraft lighting, automobile lighting, street lighting, lighting of cinemas and theatres, natural daylight, mine lighting, lighting education and television. Some 43 papers were presented of which ten were by British authors.

It was apparent from the meetings and discussions that the lighting industry of Great Britain has much to be proud of. On light sources, it has led much of the development, as for instance the calcium halo-phosphate powders which were first produced in this country and which are now used in white fluorescent lamps by nearly all manufacturers in Europe and the U.S.A. The research now being carried out here by Dr. Aldington and his colleagues on the xenon flash discharges is being watched with interest. Arrangements were made for the collection of data on the colours of all white fluorescent lamps now being made so that an attempt might be made to standardise them.

Illumination Levels

On lighting applications where differences in practice exist between countries they are generally due to economic rather than technical reasons. One item which always seems to crop up whenever two or more lighting engineers from different countries meet is the differences in recommended values in illumination which exist in different countries for the same seeing task. The reason why the same task seems to need twice as much light in, say, the U.S.A. as in this country is that the Americans aim at a higher visual performance figure than ourselves: our recommendations are based on a figure of 50% performance whilst the American figures are based on 95% performance. This extra percentage requires a far greater proportional increase in illumination which we feel is not justified. Discussions on this have been going on for many years but it has now been decided that a common basis for such recommendations should be agreed. This does not mean that all countries will then accept the same figures as some will no doubt still wish to adopt a higher standard of visual performance than that used in the British I.E.S. Code which has been suggested as the starting point.

The lighting practice report covers lighting of stores, offices, schools, industrial lighting and railway lighting; other particular fields of application have their own secretariat reports. There did not appear to be any great difference between practices in the various countries on any of these subjects though it was interesting to note that in the industrial field this country seems to have tackled and solved many problems with which other countries are still grappling. In such matters as light and colour in factories we are at least as advanced as other countries and it would appear that our range of industrial lighting fittings is far in advance of most.

Work on the application of ultra-violet radiation for germicidal purposes has been going on for some years in the U.S.A. and in the Scandinavian countries but little has been done here. It was suggested, now that high levels of illumination are common and still tending to rise, that an attempt should be made to study the health-giving qualities of ultra-violet radiations so that eventually it may be possible for artificial lighting to approach the natural sunlight spectrum in regard to both visible and invisible radiation.

Airfield Lighting

Airfield lighting again provided very active meetings, the main point of discussion being around the regulations of the International Civil Aviation Organisation for approach lighting systems which it was felt could not be met within reasonably economic limitations. An *ad hoc* committee, on which this country's representative is Mr. E. S. Calvert of the R.A.E., was formed to take up the matter with I.C.A.O. In the meantime it would seem that the British Line and Bar system is now being used in many overseas countries including Australia and South Africa.

At the final business session the new officers of the Commission were nominated and Dr. Ward Harrison was elected President. The Vice-Presidents continue as before, i.e. Dr. J. W. T. Walsh of Great Britain, M. Leblanc of France, and Mr. Ivar Folcker of Sweden. The Central Bureau remains in the U.S.A. with Mr. C. A. Atherton as General Secretary. Dr. Halbertsma, the retiring President, was elected an Honorary President.

In addition to the business meetings a number of social functions was arranged by the Swedish Committee whose organisation throughout was of a very high standard. Social functions included a civic dinner at the Stockholm City Hall, and a visit to a ballet performance at the famous Drottningholm Theatre. There was also a boat trip lasting all day on the Sunday when delegates were taken round the Stockholm archipelago. Excellent arrangements were also made for the entertainment of delegates' wives.

TARIFF REVISIONS

TWO new Area Board tariffs have been announced during the past week, the first a comprehensive list from the South Western E.B., and the second a list of revisions from the Eastern E.B.

August 6 is the deadline for operation of the S.W.E.B. new tariffs—or so soon thereafter as agreements with consumers permit. Large industrial consumers (applying where the maximum demand is 50 kW or more) will pay a m.d. charge of £6 6s./kW for the first 250 kW of maximum demand, then £5 12s. for the next 250 kW, £5 for the next 500 kW, and £4 10s. thereafter. The unit charge is 0·55d./unit for a h.v. supply and 0·575d./unit for supply below 650 V. Fuel cost adjustment is 0·0008d./unit for every penny by which the B.E.A. fuel cost varies from 38s./ton. For medium voltage supplies there is an additional charge of 4d./month for each kVA of maximum power "reasonably anticipated." In addition, on all supplies, a power factor charge of 1% of the maximum demand charge is made for every step of 0·01 by which the power factor for the year of supply falls below 0·9. Somewhat similar terms are available on a monthly tariff where maximum power is 20 kW or over. Unit charge is 0·755d./unit at medium voltage, and the initial kW charge is 12s. in a winter month and 9s. 2d. in a summer month.

Commercial demand tariff is again similar, with the addition of £2 10s./kW for excess of summer maximum demand over winter maximum demand. Block tariffs are available where demand does not exceed 50 kW, and vary from lighting at 5d./unit for first 100 units/quarter, 2d./unit for next 100, and then ¾d./unit (with adjustment for large installations), cooking at 2d./unit for first ($5 \times 10 \times$ kW of cooking plant) units, and then ¾d. Motors and heating is charged at 2d./unit for first ($20 \times 10 \times$ kW installed) units/quarter and then at ¾d./unit, and thermostatically controlled water heaters at ¾d./unit. The domestic tariff previously announced is on a three-step block system based on number of assessed rooms, reducing 5d., 2d. and ¾d./unit. The farming tariff is similarly stepped, with the units/step varying according to the anticipated m.d. Flat rate is 5d./unit lighting and 2d./unit power for the first 1,000 units, and 1½d./unit thereafter.

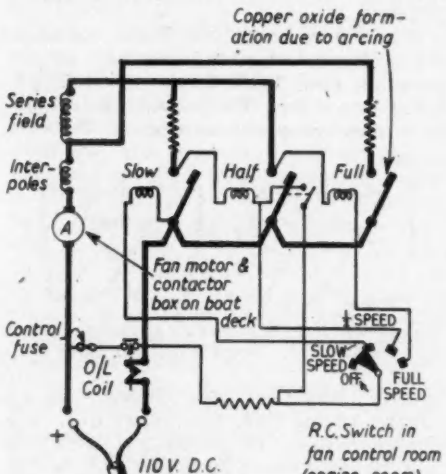
Eastern Board changes are operative from the first meter reading after August 31. Heating and cooking flat rates become 1½d./unit on tariffs below this, industrial and commercial flat rates 2d./unit. Rebates for prompt payment of industrial tariffs are withdrawn. Two-part tariffs will have a minimum fixed charge of 15s./quarter, with higher charges for the larger houses. There is no increase in unit charges, and for the domestic consumer the changes are estimated to involve an increased bill of 3d./week.

Problems and Practice

IN ENGINEERING

Oxide Slows Fan

A FAULT which occurred on a remote-controlled three-speed d.c. fan motor on board an ocean-going liner may be of interest. Complaints had been received to the effect that the supply of air to the passenger accommodation was hardly noticeable notwithstanding the fact that the relevant fan motor was switched to its full running position only a few hours previously. The extremely hot weather prevailing necessitated prompt investigation, and an inspection of the motor proved that it was running only at "half-speed" regardless of the fact that the appropriate contactors and r.m.c. switch were fulfilling full-speed conditions. The stopping of the motor accompanied with the usual mechanical and electrical checks revealed no cause of the trouble until I disconnected the supply leads for an earth test back to the mains. And though this proved to be satisfactory the remarkable result was that on reconnecting the leads the trouble disappeared and the motor ran up to full speed.



Details of fan motor connections

The possibility of inadvertently crossing the supply leads aroused suspicions which were confirmed by a reappearance of the fault on changing over the supply leads again.

A thorough examination throughout revealed eventually the formation of a thin film of copper oxide on the inner surface of the moving contact of the full speed contactor hitherto unobserved owing to the compact nature of equipment and caused no doubt by an arc of short duration, and acting as a metal rectifier. The fact that both contact pieces remained flush and undamaged verified by running the fingers over them and the registration of continuity on the megger being merely a coincidence of polarity contributed essentially to the source of trouble being originally overlooked.—*J. V. Stephens.*

Mercury and Neon

ON being requested to attend to a faulty "pilot" lighting system, I set off with the idea of being able to complete the job in a very short time. I found afterwards that there was quite a long time needed. The system had automatic mercury switches for the main control. As a neon test lamp was the only one near at hand, I accepted it to test the job with.

First of all I tried switching on all the lights, and they behaved in a most peculiar way. When some were switched on, others would either go right out or dim. I tested all round with the test lamp and found I could get a light in each way of every fuse board. Time passed by and I was testing everything and getting no satisfaction as to the cause of the fault whatsoever. I inspected the switches and even the pendants themselves, still with no results.

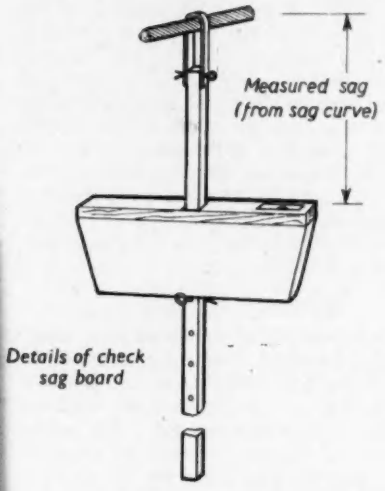
Then I decided I must find an ordinary tungsten lamp to test with. Straight away I found the root of all the trouble. One of the mercury switches had a faulty plunger and this was sticking at times.

And so I learned never to use a neon test lamp. I have not, however, learned why the system contained the mercury switching.—*M. R. J. N.*

Sag Boards

WHEN erecting conductors on overhead lines the more usual method of pulling them up to the specified tension is by the measurement of conductor sag rather than the measurement of conductor tension by means of a dynamometer. The conductors are run through snatch blocks fitted to the poles and

are pulled above the final working tension and then allowed to run back through the blocks. On heavy angles, particularly those where offset suspension sets are necessary, the conductors have a tendency to bind in the blocks. This can usually be freed by throwing a sash line over the conductors and pulling on it.



Details of check sag board

In order to check that the conductor has completely pulled through, further sag tests should be taken at odd intervals. To facilitate the checking of sags, portable sag boards were made up which could be readily suspended from the conductors. Each consisted of a wood board which could slide along a guide rod, the latter being provided with holes at regular intervals, which allowed adjustment to the required sag by inserting a split pin in the required hole.

The boards were suspended from the conductors by means of metal hangers. A sketch of a board is given. A white border hatched with red was painted along the top of the board which permitted easy sighting in.—*K. G. W.*

Battery Chargers

THE letter from J. L. W. on earthing car battery chargers in your issue of March 22 warrants a word of caution if a charger is to be used on a motor-cycle battery.

When a motor cycle is standing in its garage it is supported by one tyre and a metal stand, thus earthing that battery terminal which is connected to the motor cycle frame. It is therefore necessary to ensure that the correct point on the charger is earthed, namely the negative d.c. point on the rectifier (or positive d.c. in the case of a positive earth system on the motor cycle).

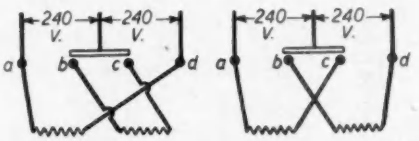
As there are four points of different potential on the low-tension side of the charger there is a three-to-one chance of earthing the wrong point with resultant burning out of either the rectifier or the transformer.

Obviously, if the correct point is earthed, everything will be all right, but perhaps J. L. W.'s moral should be amended to read "Always earth one point of the charger circuit for use on a car but check which point is earthed when charging a motor-cycle battery."—*Alan R. H. Bennett.*

Transformer Trouble

TROUBLE was recently encountered on a section of an 11 kV overhead distribution system, which was being put into commission. The section involved an air-break switch and fuses at the tapping point terminating in a 25 kVA single-phase 11 kV/480/240 V transformer, to give a 3-wire 480/240 l.v. supply. The h.t. fuses were blown on closing the switch, and a subsequent patrol of the line which revealed no fault led to a suspicion of the transformer. I might add that this was thought to be an unlikely cause of the trouble at first, as it had recently been delivered from the manufacturer.

The l.v. side of the transformer contained two windings which, when connected in parallel or series, gave 240-V 2 wire or 480/240-V 3 wire respectively. Using the Bridge Megger for a preliminary test, it appeared that the



Transformer crossed connections on the left, correct on the right. Nominal voltages shown

internal connections were crossed, and on removal of the core, this proved true. The diagram indicates the trouble, the faulty connections being shown on the left and the correct connections on the right, and it is clear how the link across *bc* constituted a short-circuited winding. The trouble was remedied simply by interchanging the ends of the winding and re-sweating. It is interesting to note that had the links been across *ab* and *cd* to give 240 V supply the error would have been unnoticed.—*D. W. O.*

Power Potential of Europe

Austria as a Power Bank for the Continent?

THE problem of increasing power generating installations throughout Europe is one which is likely to take many years to solve. Although there are substantial resources of hard and soft coal, large amounts of water-power lending themselves to hydro-electric development, peat, oil and natural gas available, in the main these resources are concentrated on small areas. Continental Europe is split up into many countries; and the wealth of these countries differs widely. Abundance in power resources, as for instance in Austria, alternates with a lack in them as in Denmark. Sometimes natural power resources represent but a fraction of the demands as in the Netherlands and in Belgium. The requirements of some countries have risen so rapidly that even their large resources proved insufficient, as in Italy. In other cases the coal resources available for use will only last a limited period and the future will be threatened by a power crisis, as in France. It will be seen, therefore, that the problem of energy in Europe can only be solved by a well-balanced co-operation by which the countries lacking in power resources can profit from the conditions in those where substantial resources exceed their future needs.

The impressive view above shows the Limberg Dam of the Kaprun power project, under construction

In this connection, the early development of hydro-electric plants is essential, but as the generation of electricity by water power varies according to season, a collateral development of thermal production is necessary.

It is generally agreed that Austria's potentialities in the development of water power exceed her estimated future needs and leave a presumable surplus for export. But prospective importing authorities will only be prepared to discuss a purchase of electric power from Austria when exact data about her efficiency have been established.

In order to confirm her efficiency in the production of hydro-electric energy Austria has founded research groups for the study of the possibilities of development of some of her water powers and for the establishment of comprehensive plans for new generating capacities. These groups have studied the development of the Oetz valley in the Tyrol (45 kms west of Innsbruck), of the Upper Inn (the Inn springs

The Silvretta Dam seen here was constructed by the Vorarlberger Illwerke

in Switzerland where there are similar schemes for its exploitation), of the Bregenzer Ache running into Lake Constance, and of the waters of the Eastern Tyrol. Another Austrian research group has been ordered to study the conditions for water power development so far as the Danube is concerned.

The reports of those five concerns have been published in the last issue of the "Oesterreichische Zeitschrift für Elektrizitätswirtschaft" issued by the Union of Austrian Public Electricity Plants. The plans prepared by those five groups do not take the whole of Austria's water powers into account, but only those of the rivers and areas mentioned above. Typical of current projects are the Kaprun scheme and the Silvretta Dam.

One of the concerns, the "Studiengesellschaft Westtirol," dealt with an area of vast hydro-electric potentialities. Although it measures but 40 kms in length and even less in width, eight storage stations can be built on it with a possible development of 1,041,000 kW and an annual production of 2,190,000,000 kWh, 61% of which will be available in winter. The catchment area is 893 kilometres square and the difference of level between 2,340 and 660 metres will be exploited. The plans have been carefully prepared and include the utilisation of the Oetz river, its tributaries, the diversion of its neighbouring creeks and the construction of eight reservoirs. The cost per kWh produced will be 0.122 Austrian schillinge.

The "Studiengesellschaft Oberer Inn" reports that a development of the Inn could yield 392,000 kW and 1,409,000,000 kWh per year, 43% of which will be available during the winter months.

By developing the water powers of the Bregenzer Ache in nine sites, four of which would be storage sites, 533,000 kW can be installed and 1,222,000,000 kWh gained per annum, 61.5% being available in winter.

The "Studiengesellschaft Osttirol" reports that 430,000 kW can be developed and 1,205,000,000 kWh obtained in the Eastern Tyrol, of which 68% will be available in winter.

The studies for development of the Austrian part of the Danube proved that 1,621,000 kW can be produced in 12 stations and 11,095,000,000 kWh obtained. Summing up the results of these five studying groups it can be said that Austrians have studied the hydro-electric potentialities of some of their rivers and have worked out plans for the building of 38 sites (18 of which will be storage stations). These could lead to an output and export of 4,017,000 kW and 17,121,000,000 kWh per annum. This output alone is considerable, but the surplus from the total of Austrian water powers is much higher.

In consequence, Austria is in the position to exercise a strong influence on the balance of European energy, and may provide the solution of other countries' power problems. For this reason the development and utilisation of Austria's water powers would seem to be an essential condition for European reconstruction.

BRITISH PURCHASING COMMISSION

Names and addresses of the remaining representatives appointed by the newly formed European Purchasing Commission were announced last week. Similar details of offices in Belgium and Germany were given in our June 7 issue. The purpose of the Commission, as readers will probably recall, is to encourage the procurement on the continent of stores and equipment required for the defence programme, but it will also be available to help civilian manufacturers who want to either establish contacts in Europe or purchase goods for their own needs. The recent announcement covers three more countries, the directors appointed and their addresses being Sir Charles Henderson, 116 bis Avenue des Champs Elysees, Paris 8; Mr. W. Rogerson, Via Borgonovo 10, Milan; and Mr. Max Binney, St. Peter Strasse 11, Zurich. In addition, representatives have also been appointed in Spain and Denmark. Mr. W. Maude can be found c/o H.B.M. Embassy, Calle Fernande El Santo 16, Madrid, and Mr. A. K. Duthie at Gentofte, Denmark. All offices are now established.

LIGHTING THE HOUSE OF LORDS

LITTLE has hitherto been published about the lighting in the refurbished House of Lords since, as is generally known, it was the intention to interfere as little as possible with the existing atmosphere, rather than install a completely new lighting system. This particularly applied to the actual fittings. Designed by Augustus Welby Pugin, who, as assistant to Sir Charles Barry, carried out much of the decoration of the House in 1836-7, the fittings are really remarkable specimens of the metalworker's craft and so perfectly in keeping with the general architectural pattern that it is small wonder their Lordships refused to contemplate their replacement by fittings of modern design, however distinguished. Raising the efficiency of the existing fittings without destroying their character was the problem facing the Ministry of Works and examination of the accompanying illustrations will show the quality of the result achieved, although it gives little indication of the tremendous amount of experiment necessary before the simple and successful solution emerged.

Originally designed for gas lighting, Pugin's fittings had been modified to support clusters of bare lamps; each of the six points of the fittings in the Chamber supporting five 40 W bulbs. Each of these clusters, in the present modification was removed and replaced by a single 150 W lamp accommodated in a standard Holophane enclosed prismatic reflector unit of the type which has been widely used by the Ministry of Works. This

The re-modelled fittings in the Princes' Chamber

(Below) Night-time views of the Lords' Chamber from Lobby and Throne ends
Photos by Hobbs Offen Ltd., for Holophane Ltd.

modification, as well as greatly improving the appearance, gave an average illumination intensity of 9 ft candles on the working plane, as against 1·5 ft candles with the previous arrangement, while the consumption per fitting was actually reduced from 1,200 W to 900 W.

A further modification which gave an enormous improvement to the general lighting scheme, without essential alterations to the character of the fittings, was the addition of indirect lighting. A trumpet or flower-shaped brass unit has been skilfully added inside the body of the fitting, its mouth pointing upwards and the incorporated lamps casting a brilliant illumination upon the magnificent painted ceiling which, hitherto, has been little but a dark background to the cluster of bare bulbs.

The lighting of three large frescoes in recesses at each end of the Chamber also presented something of a problem particularly those at the Throne end, since the recesses there are considerably shallower and the available "throw" is very short. External floodlights were, of course, out of the question and the difficulty of obtaining even illumination on a large expanse by edge-lighting hardly needs emphasising. The problem was ultimately solved by the Ministry of Works engineers. Tubular tungsten lamps, enclosed in special reflectors, are employed concealed in the side mouldings and these tend to suppress light in the zone nearest to the fitting. The fittings each illuminate the further side of the picture, having beams that overlap. The peak intensity falls across the picture at two-thirds of its width and this gives a very even illumination, free from specular reflection when viewed from any point in the Chamber.

Pugin's magnificent 12-light fittings in the Lords' Lobby and the Princes' Chamber have been modified in a similar manner to those in the main Chamber and it is now possible to appreciate fully the beauty of the ceilings in both apartments. In the Division Lobbies, the original gas fittings have been replaced by completely new 6-light fittings by the Escare Art Metal Co., Ltd., to Ministry of Works design. The entire lighting for the House is controlled from one central control room external to the Chamber. The control panel, built by Messrs. Micklewright Ltd., incorporates two motor-driven dimmers, one for the general lighting and one for indirect lighting and the frescoes. The panel includes light-meters to enable the operator to judge the illumination of the House. The wiring installation was carried out by Messrs. Troughton and Young and translucent lighting fittings were supplied by Holophane Ltd.

No one who has been privileged to view the final result could fail to be impressed with the majestic atmosphere or to admire the skill with which the Ministry of Works engineers have carried out their task.

INTERNATIONAL CONFERENCE ON AUTOMATIC CONTROL

AUTOMATIC control, as such, was nothing new, said SIR BEN LOCKSPEISER in his address as president of the International Conference on Automatic Control, which opened at the College of Aeronautics, Cranfield, on Monday last. What was new, however, was the emergence, during the last few years, of a philosophy of automatic control, a general realisation that the independent developments in widely separated fields were all part of one pattern, the decisive contribution to this outlook being the development of the feed-back amplifier.

The scope of the basic conception of the principle of the "closed sequence of dependence" is seen to extend even beyond engineering, and it is believed that the characteristics of behaviour connected with it will prove valuable in the biology, economics, and even wider fields, rendering it possible to apply engineering methods of analysis to problems in more indeterminate spheres.

The papers being read at the conference deal more with general concepts than specific applications. It is hoped that discussion—formal and informal– between engineers in the field of process control and in that of servo-mechanisms, will be of considerable mutual assistance in obtaining a greater measure of agreement in the points of view and nomenclature in these two fields than has hitherto been the case. Several of the papers were concerned with the alternative ways in which a given specification of requirements may be met and the possibilities of devising design procedure that would indicate optional design without the inordinate amount of labour and calculation at present involved. Such developments, if they could be carried to a successful conclusion, would help to cheapen the application of automatic control, and so widen its field of use. At present, economic, not technical, considerations set the practical limit to what could be done with automatic control.

More than 300 engineers are attending the conference, including many distinguished visitors from overseas. It has been organised by the Department of Scientific and Industrial Research. The proceedings, including papers and discussions, are being published in volume form by Butterworths Scientific Publications, Ltd.

overseas news

Rural Electrification

Tatiara District Council, South Australia, has received Minister of Local Government approval of the payment by the Government of a subsidy of £9,300 towards the cost of rural electricity extension which the council is carrying out. This subsidy has been made under the provisions of the Electricity Supplies (County Areas) Act, 1950, under which such approved extensions may be assisted to a maximum of 50% of the cost.

Jap Insulators

The State Electricity Commission of Queensland has been authorised to purchase a further quantity of insulators from Japan at an approximate cost of £3,687, the Minister of Mines announced recently. The insulators are being imported on behalf of the Queensland electric authorities and the Railways Department.

Pine Falls

Two of the 19,000-h.p. turbines at the Pine Falls hydro-electric plant will probably be in operation before the end of the year, Mr. J. R. Rettie, project engineer, told the Manitoba Hydro-electric Board last month. By the fall of 1952, all six turbines are expected to be in use, their total of 114,000 h.p. adding 20% more power for the province. At present, all plants generated a total of 550,000 h.p. Original cost of the plant was set at $21,000,000, excluding transmission lines, Mr. D. M. Stephens, chairman of the Board, stated. The latest survey shows costs will be up to $23,500,000, including transmission lines (which adds another $1,000,000 to the total). Cost to date is $14,000,000.

Alberta's Plan

There seems little likelihood of the proposed South Saskatchewan river development project being proceeded with this year, according to reports. The report upon the project is now being reviewed, but it is expected that some months must elapse before the Federal Government will be in a position to make any decision. The project involves a large earth-filled dam at Elbow and a second one in the Qu'Appelle valley. The reservoirs thus created would extend back for 140 miles on the Saskatchewan river and 30 miles down the Qu'Appelle valley. The powerhouse and spillway would be at Cateau Creek, near Elbow. Estimated cost of the scheme, which would provide 400,000,000 kWh annually, is $102,000,000. In discussions in the Federal House at this session it has been pointed out that the proposed project would take ten years to complete, but little labour would be required for the first two years, during which time the tunnels to divert the river flow would be in course of construction. Moreover, it is contended, little steel would be required.

Power for Manitoba

Arrangements are being made to increase power supplies from Ontario sources on the Winnipeg River to the Province of Manitoba. This information was given recently by Mr. R. H. Saunders, chairman of the H.E.P.C. of Ontario, who outlined three possible means of easing Manitoba's pending power shortage. But any such arrangements depends on the continued mutual negotiations between the Ontario and Manitoba Governments.

Ottawa River—Rapids No. 2 to give 40,000 h.p.

Premier Duplessis announced in Quebec recently that the Ottawa River's Rapids No. 2 will be harnessed to produce 40,000 more horse power. This scheme will cost $11,000,000 and work will commence shortly on this scheme which will supply power for Abitibi and Temiscamrugue counties. The Quebec Department of Hydraulic Resources is reported to be studying the possibility of further schemes on the Megiscane and Bell rivers.

Shawinigan Wins Tax Appeal

The Montreal Income Tax Appeal Board has found in favour of an appeal by Shawinigan Water and Power Co. and has accepted a deduction of $316,000 imposed against the company under a Quebec law which commanded the company to pay this sum under an "act to ensure the progress of education." The Board found that the imposition on the company was not actually a corporation tax, was not properly a tax at all, and therefore the company was entitled to claim a deduction for the amount in the realm of federal taxation. This decision is likely to affect several other Quebec companies.

German Power Expansion

Four electric power projects in the West German Federal Republic, financed mainly with E.R.P. counterpart funds, are rapidly nearing completion. The E.C.A. Mission to West Germany has announced that work on three of them, located in Bavaria (U.S. zone) will be finished in July and they will then go into operation immediately. This will bring the total of electric power projects in West Germany completed under the E.C.A. programme, to 28. Another 25 remain to be completed during 1951 and

1952. The four projects now nearing completion will add 96,000 kW to the Republic's capacity and are expected to produce 455 million kWh annually. Three are in Bavaria and one at Dusseldorf.

T.V. for Germany

Next year will see the introduction into Germany of a television service. A 100 W experimental station is to be built in Hamburg. After a six-month period of test transmission, a more powerful transmitter will begin broadcasting a regular two-hour daily programme.

Kansas power engineers fight floods

As we go to press news is arriving from flood-ravaged Kansas City of the efforts by the flood fighters to save the public utility installations in the city. Nearly a million and a half acres of Kansas and Missouri are under water, the worst floods in America's history, where water from the Kansas and Missouri rivers has in some places reached depths of 20 ft. Engineers have thrown up a "levee" an anti-flood wall of sandbanks and earth, to protect the plants. It has reached 15 ft and is still increasing as the fight against time continues. The gas works and a major water pumping station have been inundated. Damage is so great that the Federal House of Representatives has made a grant in aid of $15,000,000.

United States Self-sufficient in Mica?

A new company has been formed in Schenectady, New York, which would use patents based on the work of a French scientists to produce electrical insulation from domestic scrap. This might mean the end of U S. dependence on foreign sources for raw mica.

Advisory Committee for Mexico

The Mexican Light and Power Co. Ltd., a company incorporated in Canada, has decided to establish an advisory committee including board members and people prominent in the life of the country. The committee, it is considered, will assist in establishing and maintaining closer liaison between the board and important sectors of Mexican life.

Electric Plant for Peruvian Zinc Mines

Electric generating and distribution plant for a new hydro-power plant on the Paucartambo River in South Central Peru has been ordered by Cerro de Pasco Corporation, as part of a programme to expand zinc production, from Westinghouse Electric International Company. The power is required to help Cerro's operations at La Oroya reach an ultimate capacity of 200 tons of zinc daily. The equipment scheduled for delivery by mid-1953, includes three 24,000 kVA waterwheel generators, four 25,000 kVA step-up transformers, three auto-transformers and fourteen outdoor circuit-breakers.

Madras Development

Rural electrification is the predominant theme of supply undertakings in Madras these days, in view of the tight power position. This is exemplified in the administration report of the Electricity Department of the Government of Madras for the year 1949-50. During that period, a total of 605·8 million units were generated, compared with 569·4 million in the preceding twelve months. Of the total, water power accounted for 463 million units. Of the total number of consumers served by all electrical undertakings in the State, 247,026 were in the area covered by Government undertakings, 87,927 served directly by the Electricity Department and 159,099 by licensees distributing Government power. The balance of 9,843 were served by self-generating licencees. A further 194 villages were electrified during the year—126 of which were by the Government Electricity Department. In addition, 2,441 pumping sets were connected.

India's "T.V.A." Scheme

In a broadcast on All India radio the chairman of the Damodar Valley Corporation, Mr. Maxumdar, spoke of three years' progress. He mentioned that work on the Bokara Power Station was nearly completed. It would produce 150 MW he said, and would cost 80,000,000 rupees. Four dams would be completed by 1955. This scheme is referred to as India's "T.V.A." scheme.

Israel's Investigators Named

Following our report in last week's issue of the appointment of a committee to investigate the electricity supply problem in Israel the names of the three members have been announced. They are Mr. Eliezer Bavli, a Certified Public Accountant, Mr. E. Hoofien, chairman of the board of directors of the Bank Leumi and Mr. Peretz Naftali, a member of the Israeli parliament. An official of the Palestine Electric Corporation stated that units generated should have increased 120% by the end of next year, by which time the installation of the 30 mW set in Haifa and a 50 MW unit at Tel Aviv, together with the return of a larger machine at present under repair in the U.S. will be completed.

Diesel Power for Port Said

Egypt's Governor of the Suez Canal Zone visited the new power station at Port Said recently during handing-over trials. The new station has two Mirrlees turbo-charged Diesel alternator sets giving 1,225 kW, which is fed into the existing network through the old power station. Switchgear is by Brush Electrical Engineering Co.

PERSONALITIES

IN THE INDUSTRY

The Rt. Hon. Viscount Falmouth, COMPANION I.E.E., M.I.Mech.E., of Chelsea, and **Mr. C. G. Morley New,** M.I.E.E., of Esher, have been re-appointed by the Minister of Fuel and Power as part-time members of the South Eastern Electricity Board.

Two new appointments have been announced by the Metropolitan-Vickers Electrical Co., Ltd. **Mr. J. P. A. Meldrum,** O.B.E., B.SC., M.I.E.E., has been made Special Assistant, Sales Management. Mr. Meldrum was educated at Rugby and Glasgow University. After a vacation apprenticeship at M-V in 1924, he joined the company as a college apprentice in 1926; subsequently he was a special switchgear trainee, and in 1930 he was appointed to the staff of the Switchgear Engineering Department. He visited Australia, New Zealand and U.S.A. in 1939. On the outbreak of war, he was called up from the Supplementary Reserve of Officers and served in the Royal Corps of Signals in England, France, Belgium and Germany, attaining the rank of Lieutenant-Colonel. He was awarded an O.B.E. and was mentioned in despatches. In October, 1942, he returned to the company and re-joined the Switchgear Department, of which he became Sales Manager in 1946.

Mr. J. P. A. Meldrum

Mr. J. E. Stubbs, B.SC., A.M.I.E.E., has been appointed Sales Manager, Switchgear Department. Mr. Stubbs was educated at Bristol University, and after a college apprenticeship and a period in the Switchgear Drawing Office at Trafford Park, he spent eight years with the M-V agents in Cairo, where he acted as the company's engineer on the North Delta Pumping Stations contract. In 1939 he joined the Tendering Section of Switchgear Engineering Department. He became Assistant to Sales Manager, Switchgear Department, in 1948, and Assistant Manager in 1950, and has made many visits abroad, notably to Portugal and Spain in connection with hydro-electric work. Since the war he has been to Germany as a member of a B.E.A.M.A. team for the study of German switchgear, and towards the end of 1950 he made a tour of Australia and New Zealand.

Mr. J. E. Stubbs

Mr. F. J. Stephens has been appointed a managing director of the Shell and the Anglo-Saxon petroleum companies, consequent upon the recent retirement of **Sir George Legh-Jones.**

Hirst, Ibbetson and Taylor, Ltd., of Salford, announce that **Mr. John Hunter Hirst,** son of the managing director, has been appointed a director of the company.

We hear that **Mr. D. McLeod,** B.SC.(Eng.), A.K.C., A.M.I.E.E., has taken up an appointment in Saudi Arabia on behalf of Messrs. Preece Cardew and Rider Ltd. He is to carry out the duties of construction engineer for the electrification of Mecca. Mr. McLeod was formerly the electrical engineer to the Public Works Dept. in North Borneo.

Mr. D. McLeod

Vice-president and chief engineer of the B.C. Electric Co., Vancouver, **Mr. Tom Ingledow,** B.SC., M.A., has been elected the new president of the Canadian Electrical Association. Born in Cumberland, he was educated at Glasgow and London University and went to Canada in 1923 as a draughtsman with Ontario Hydro. A former vice-president of the C.E.A., he has been associated with Canada's power industry for the last 28 years.

Mr. P. D. J. Druiff has resigned his position of economist to the British Electrical and Allied Manufacturers Association, and been appointed secretary to the Woollen and Worsted Trades Federation.

Formerly works manager at the Blythe Bridge cooker factory of Simplex Electric Co., Ltd., **Mr. W. Todd** has now joined the staff of John Gordon and Co., Ltd.

Mr. Joe N. Roche, of Roche and Roche, Colombo, one of the largest importers of electrical goods in Ceylon, is at present on a visit to England and the Continent until October. He may be contacted through Rigold and Bergmann Ltd., of 69 Bishopsgate, E.C.2.

Mr. I. J. Hayward, J.P., has been re-appointed chairman of the London Electricity Consultative Council.

The Minister of Fuel and Power has appointed **Alderman A. Ashton** of Leamington, and **Mrs. A. M. W. Howard** of Barford as members of the East Midlands Consultative Council.

Other appointments to consultative councils announced by the Ministry are **Alderman J. Randles** of Stockport as a member of the North Western council to fill the vacancy created by the resignation of **Mr. C. G. Ashworth,** J.P. **Alderman A. P. Derrick,** J.P., of Lancaster, has been appointed an additional member of the N.W. council. **Councillor C. A. E. C. Howard,** of Bedford, and **Councillor E. C. Amey,** of Watford, have been appointed to the Eastern Electricity Consultative Council, in place of **Councillor A W. Sanders,** of Bedford, and **Alderman H. Coates,** of Watford. **Mr. G. H. Marwood,** of Wymondham, Norfolk, has been appointed an additional member of the Eastern council.

It is not often that long service awards are presented to as many as 646 employees at a time. Such a ceremony, however, took place last Saturday at the North Eastern group of companies comprising the North Eastern Marine Engineering Co., George Clark, Ltd. and Richardsons, Westgarth, Ltd., Mr. O. J. Philipson and Sir Summers Hunter, chairman and managing director respectively, made the presentations.

Mr. H. G. Ivatt, M.I.Mech.E., who retired last month from the position of chief mechanical engineer, L.M. Region, British Railways, has now joined the board of directors of Brush Bagnall Traction Ltd., and will be available as technical consultant on diesel locomotives. This is the second appointment of wellk-nown B.R. personnel to the Brush A.B.O.E. group within a month, as **Mr. Miles Beevor,** J.P., B.A., M.Inst.T., was appointed deputy managing director of the Brush Electrical Engineering Co. Ltd. in June last.

From Newcastle-on-Tyne comes the news that **Mr. A. J. Hansell** has retired from the position of manager of Thomson and Brown Bros. Ltd.

Mr. C. C. Oakham, formerly chief engineer with the Newcastle-on-Tyne Transport and Electricity Dept., has been appointed to a similar post with the transport department of Manchester.

Control of the development division of London Transport, concerned with rolling stock and associated equipment, has passed to Mr. R. I. D. Arthurton, B.Sc., A.M.I.Mech.E., who has been appointed a principal executive assistant.

Mr. John ("Reg") Taylor, a pioneer in rural electrification for Liverpool Corporation Electricity Dept., has retired from the Merseyside and N. Wales Board after 40 years' service in the industry.

Mr. S. O. Thomas of Roch, Haverfordwest, has been appointed to the South Wales Consultative Council in place of **Lt.-Col. P. Lort Phillips. Mr. Rees Owen** of Pennybont, Carmarthen, has been appointed as an additional member.

OBITUARY

The death has occurred of **Mr. C. E. D. Greenhalgh,** M.I.E.E., who was for many years engineer and manager to the Ilkley Urban District Council. prior to vesting day, after which he continued as local manager to the Yorkshire Board, retiring about 18 months ago. He was for many years a member of the executive committee of small undertakings, and served on the Mid-East England executive committee of E.D.A., also treasurer to the Leeds Committee of the A.M.E.E.

A serious loss will be felt by the Revo Electric Co., Ltd., in the death of their managing director, **Mr. A. E. Felton.** Particularly so since he has a long association with the firm. Mr. Felton joined the company when it was first established and it was then known as the Cable Accessories Co. He became commercial manager from 1911 until 1915, when he became general manager, and in 1918 a director. He was appointed assistant managing director in 1930, joint managing director in 1942 and managing director in 1949.

During the thirty-eight years he served in a senior executive position he played a leading part in the expansion of the firm and took a personal interest in every aspect of the factory and its personnel. His death on July 13 at an age of sixty-nine will be deeply felt by his many friends both within the firm and in the industry.

The death is reported of **Mr. J. Whipps,** sales manager of the General Cable Manufacturing Co., Ltd., Leatherhead, with whom he had been associated for 27 years.

Prentice Ltd., of Leeds, announce with regret the death of their founder and managing director, **Mr. H. B. Prentice.** The family association with the firm will, it is stated, be maintained.

From Dublin comes news of the death of **Dr. J. F. Crowley,** D.Sc., M.I.E.E., of J. F. Crowley and Partner, at the age of 67. Dr. Crowley, in addition to his consultancy practice, was on the council of the Textile Institute and of the Illuminating Engineering Society. He was associated with the Shannon scheme, and was vice-chairman of committees on Irish water-power resources.

Mr. Ralph Snape, foreman electrical fitter for the Coventry sub-area of the East Midlands Board, died recently after 39 years' service with the Coventry electricity department.

GIFT OF A BOILER

A STEAM generating unit was handed over to Birmingham University by Mr. C. F. Hauge, director of Babcock and Wilcox Ltd., as an addition to the equipment of the mechanical engineering department at the University. The unit is similar to that given to Cambridge University a short time ago. The boiler will be used for instruction and to give students experience, as well as to provide power for other laboratory equipment. After the ceremony of handing-over, the Pro-Chancellor unveiled a small plaque on the boiler commemorating the occasion and the donors.

PLANT IRRADIATION

New Results from the John Innes Institution

INTERESTING results on the irradiation of plants with artificial light are given by MR. W. J. C. LAWRENCE of the John Innes Horticultural Institution, who describes the technique involved. The seedlings are pricked-out immediately after germination, and then illuminated for 9-10 hours a night for the next 20 nights.

The lamps used are 400W horizontal h.p. mercury vapour, in suitable reflector fittings, at a height of about 3 ft above the bench. Spacing is at 4-ft centres, and it is stated that a square layout is better than a long rectangular one.

As will be seen from the accompanying illustrations, encouraging results have been obtained. Tomato seedlings, it is stated, flower two weeks or more before the "control" specimens, while in full-scale trials carried out in 1947, the irradiated plants produced 2,062 boxes (12 lb) of early fruit per acre, as against 1,323 for the controls. Similar tests carried out a year later gave 2,978 as against 1,378. The total amount of fruit obtained during the season was also higher, total yields being 8,028 against 7,824 boxes for the first tests, and 8,305/7,098 for the later series. It is believed that it is possible to recoup the capital cost of the equipment (stated as about £150 for a 10-lamp unit) within a single season.

Work is still regarded as being in an experimental stage, and investigation is proceeding on day *v.* night illumination.

In these illustrations, with the exception of the top right, the illumination was for 10 hrs/night for 20 nights. Top right are tomato plants 20 weeks old, bottom right are the same plants 12 weeks old. Centre left are seedlings, 3 weeks old from pricking out and bottom left are cucumber plants 12 weeks old

NEW LITERATURE

Diesel Fault Tracing, Maintenance and Repair

by Staton Abbey

THE diesel engine, particularly in its smaller sizes, is being used by an ever-increasing number of people. Small diesel-electric sets are being installed in factories and workshops as standby plant against power cuts, and, as prime movers, are in favour for traction and shipping. Many of these plants are operated by semi-skilled labour, and much expense could be saved by their owners if they were subjected to regular maintenance and overhaul. It is mainly on behalf of these owners that this book has been written.

Without delving too deeply into the basic thermodynamic principles of diesels, it yet presents a clear and concise account of their operation, gives charts for fault-finding, illustrates methods of dismantling and assembly, and provides notes on adjustment and settings both of the main engine and its auxiliaries. The field covered is limited to the high-speed machine, and only brief reference is made to the electrical equipment which may be associated with such plants. Published by Sir Isaac Pitman and Sons Ltd., 241 pages, 5 in. by 7½ in. Price 17s. 6d.

Air Compressors—Control and Installation

by P. C. Bevis

MOST branches of industry find use for compressed air in some process, and this publication is intended to help the user make the most efficient use of his particular plant. The detail that strikes the reader on his first acquaintance is the admirable clarity of the many line drawings which are included to illustrate descriptions in the text. For the maintenance man, this volume should prove an excellent background to the individual manufacturers' manuals and in this respect it may be noted that two chapters are given over to electro-mechanical control gear and its application, and a third to the related subject of safety devices. Published by Pitman, 192 pages, 8½ in. by 5½ in. Price 20s.

Domestic Refrigerator Handbook

prepared by E.D.A.

PRIMARILY intended for those concerned with the installation and maintenance of electric refrigerators in the home, this book is intended to supplement—not supplant—makers' handbooks. Commencing with a simple exposition of the theory of refrigeration, it devotes further chapters to the action of expansion systems of both dry and flooded types, to the installation and service of both types, and to hermitically sealed units. Absorption type refrigerators have a chapter to themselves, as do the various types of refrigeration motors. There is a chapter devoted to workshop practice giving the results of a wealth of practical experience, and a number of appendices including tables of useful data. The book is of an essentially practical character and is well illustrated. Published by the British Electrical Development Association, 2 Savoy Hill, W.C.2, it contains 150 pages, 7 in. by 4½ in., and costs 5s. for a single copy, with a reduction for quantities.

Short-Wave Wireless Communication

by A. W. Ladner, A.M.I.C.E., *and C. R. Stoner*, B.SC.(ENG.), M.I.E.E.

IN its first post-war edition this well-established and much-used textbook shows signs of a thorough overhaul, in pursuance of the "tradition of producing a textbook dealing with the general principles of short-wave wireless communication"—the authors' own modest description. Rewriting and incidental modernisation is apparent throughout the book, but in addition to this some new chapters have been added, the subjects thus dealt with being sound and vision intelligence, wave guides, and wireless telegraph circuits. For the rest, the book proceeds on its familiar way—modulation, and then wave propagation: aerials, amplifiers and oscillators, and modulation circuits: reception theory, and typical receivers and transmitters. Published by Chapman and Hall, 717 pages, 8½ in. by 5½ in. Fifth edition, price 50s.

BOOKS RECEIVED

The Oxide Coated Cathode, by G. Herrmann and S. Wagener. First volume of English translation of German book; this volume deals with manufacture. Published by Chapman and Hall, 148 pages, 8½ in. by 5½ in. Price 21s.

Travelling Waves on Transmission Systems, by L. V. Bewley. Deals with theory applied to design and protection of power frequency lines. Published by L. V. Bewley, 543 pages, 9 in. by 5¾ in. Second edition, price 96s.

Electronic Applications, by H. A. Miller. Electronic techniques applicable to various branches of industry, research, etc. Published by E. and F. N. Spon, 110 pages, 8½ in. by 5½ in. Price 18s.

Polyphase Commutator Motors, by B. Adkins and W. J. Gibbs. Covers theory of most types of a.c. polyphase commutator machine. Published by Cambridge University Press, 243 pages, 8½ in. by 5½ in. Price 21s.

Electric Lifts, by R. S. Phillips. Design and installation. Published by Pitman, 377 pages, 8½ in. by 5½ in. Third edition, price 50s.

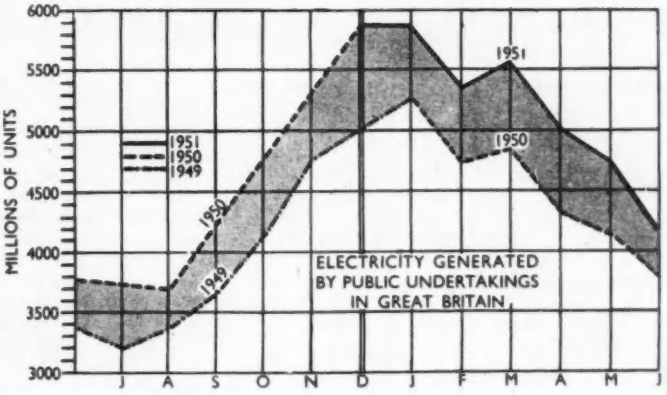
Alternating Current Armature Windings, by C. S. Siskind. Theory and design of windings as geometrical arrangments. Published by McGraw-Hill, 236 pages, 9 in. by 6 in. Price 42s. 6d

UNITS GENERATED

4,165 million units was the total generated during June in stations under the control of the B.E.A., the North of Scotland Board, and the Lochaber Power Company. The corresponding figure last year was 3,755 million, so there has been an increase of 10·9%.

Of the total, 4,077 million units was generated in steam stations, and 78 million in hydro-electric.

Energy sent out during the month was 3,919 million units, 94·1% of that generated. This gives a total for the first six months of 1951 as 29,081, an increase of 13·4% on the corresponding period of 1950.



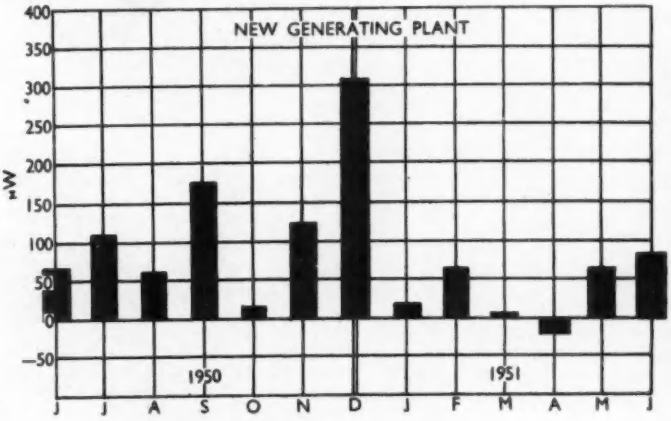
POWER SUPPLY IN JUNE

NINE B.E.A. stations figure in the power supply figures for last month, which show an increase of 88·5 MW in generating sets and 2,470 klb/hr in evaporative capacity. Three stations, Blackwall Point, Bromborough and Nechells B, figure in the returns for the first time.

Beginning in the south of the country Croydon B (S.E. Div.) is the first station to note. A third 320 klb/hr Simon Carves boiler has been installed there. Blackwall Point (Greenwich, London Div.), already mentioned, has a 30 MW Parsons set and a 365 klb/hr Babcock and Wilcox boiler, with two more of each to come. Battersea B, in the same division, is credited with a 6 MW house set. In the Eastern Division, at Peterborough, the second of the three 160 klb/hr B. and W. boilers forming the present extension, was commissioned.

At Llynfi (S. Wales Div.) the second 300 klb/hr Stirling boiler of the present extension has been commissioned, leaving one set to come for the completion of these extensions. Further north, at Birkenhead, two 300 klb/hr B. and W. boilers were commissioned in the new Bromborough (M. and N.W. Div.) station. At Nechells B (Birmingham, Midlands Div.) the initial commissioning has been one 52·5 MW Parsons set and one 230 klb/hr International Combustion boiler. Also in this division is Walsall, where a ninth B. and W. 180 klb/hr boiler is noted.

Finally, in this month's list, comes Agecroft (N.W. Div.) with the second 315 klb/hr International Combustion boiler of the present extensions.



GENERATING PLANT

At the end of June, 1951, the installed capacity of the B.E.A. was 14,733 MW, showing an increase of 88 MW on the previous month. In the same period, the North of Scotland total decreased by 2 MW, falling to 565 MW. The figure for overall increase during the last twelve months becomes 1,003 MW, or 7.0%.

The total installed capacity used for the purposes of this graph should be distinguished from the output capacity. The installed capacity is the total m.c.r. of all the generating sets which are connected on both steam (if appropriate) and electric sides and are suitable for service.

E.I.B.A. Annual Meeting

ONE thousand, one hundred and twenty-seven people helped at a cost of £37,118. That is the first of the salient features of the Electrical Industries Benevolent Association 1950 report selected by Mr. E. C. Holdroyde, retiring president, for underlining. The answer to the increase these figures show was put by the president as "larger subscriptions to meet greater hardship."

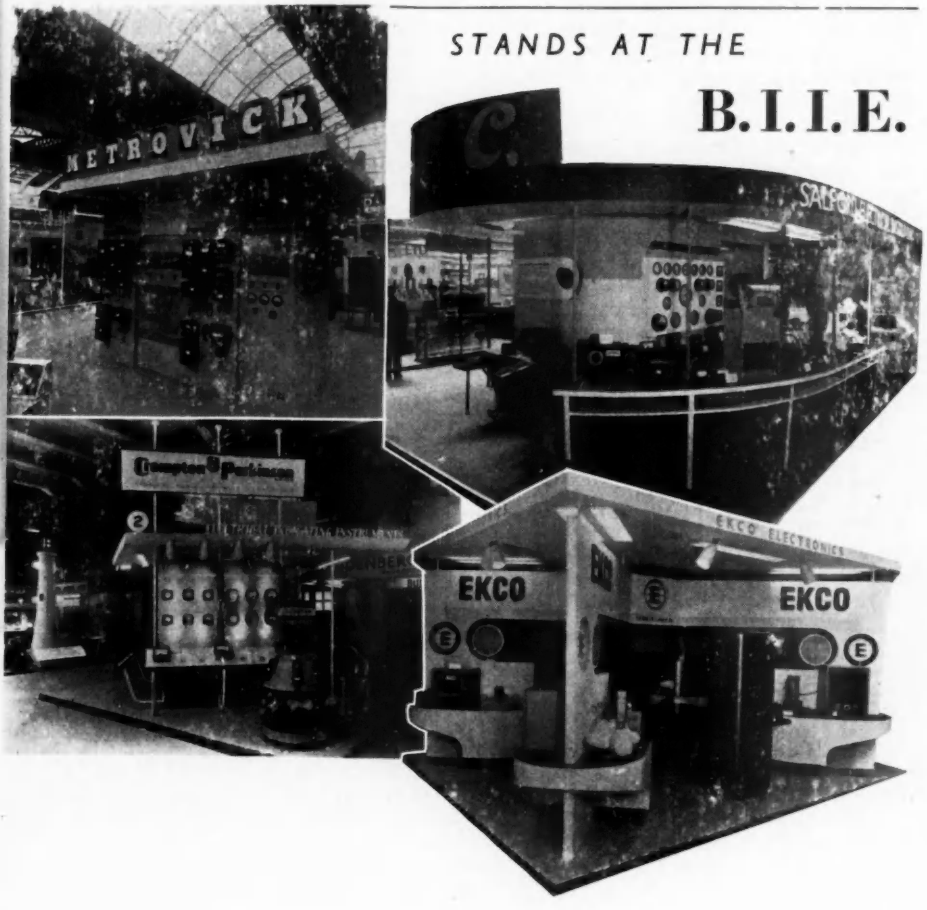
Expensive Work

The occasion was the A.G.M. of the Association, held last Friday in the offices of the Institution of Electrical Engineers, at Savoy Place. In his introduction of the annual report, Mr. Holdroyde went on to emphasise that treatment and care in cases of tuberculosis was becoming a particularly expensive branch of the Association's service, with a cost in 1950 of over £12,000. Particular thanks for the carrying out of the work of assistance was due to those voluntary workers, the branch secretaries, treasurers and collectors.

The income of the Association, at £39,771 has not increased at the same rate as the growing needs for help. Expenditure has increased by £7,407, while income is up by only £4,400.

After the report had been formally accepted, Mr. C. R. King (Chairman, East Midlands E.B.) took up his presidency of the Association, and made his first act that of congratulating Mr. Holdroyde on his two years of service in that office. Mr. King went on to say that he would consider it his duty to increase income through subscriptions from members and associate members, but he felt that succeeding Mr. Holdroyde, it would be a difficult task for him to rival or outdo the retiring president's activities.

Mr. L. C. Sharp was re-elected Chairman of the Court. This marked his silver jubilee of service to the Association, and he was congratulated by all present. Mr. Raymond Ely (Foster Electrical Supplies, Ltd.) was elected an additional member of the Relief Committee.



STANDS AT THE

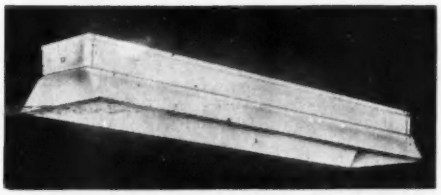
B.I.I.E.

The BUYER'S *Column*

New Metrovick Fittings

A NEW range of lighting fittings for fluorescent lamps is due to be marketed on September 1, 1951, by METROPOLITAN-VICKERS ELECTRICAL CO., LTD., Trafford Park, Manchester, 17. They are 4-ft. 40-watt and 5-ft 80-watt lamps; other lengths and sizes will soon be added to the range.

The main feature is a basic channel, designed



This M.V. fitting has a closed-end metal trough

to facilitate erection for either direct ceiling mounting, suspension by chain or conduit. No modification is required for instant start gear.

A complete range of reflectors to cater for all types of general lighting service requirements will be available. These reflectors are interchangeable and readily attached to the basic channel by means of "Oddie" clips. This use of interchangeable reflectors enables flexibility in stocking and as the reflectors are designed to nest, the space required for stocking and transporting them is reduced to a minimum. No "live" parts are exposed when the reflectors are removed from the basic channel for maintenance purposes.

The basic channel, and all industrial type reflectors are constructed of sheet steel, bonderised, and stove enamelled as standard. All units are complete with lampholders, and are ready wired with auxiliary gear including a new brick-shaped choke which provides noiseless operation without compound filling.

Separate end plates with single screw fixing enable "Perspex" enclosures, or side screens and metal louvres, to be used with the basic channels to provide attractive commercial lighting units.

A New Pump !

JUST acquired by HENRY BALFOUR AND CO., LTD., Durie Foundry, Leven, Fifeshire, are the manufacturing rights of the Meader pump, an interesting pump which appears to have a bright future in the handling of heavy materials such as mud, clay, sewage, etc., and the residue from many manufacturing processes.

In recent demonstrations quantities of bauxite residues with a 30% water content were easily pumped through 200 ft of piping. Lime sludge from a sugar-beet works was handled with equal ease and convenience.

Power is supplied by 15 h.p. electric motor which drives a three-stage centrifugal pump supplying a pressure of 150 lb. The hydraulic fluid necessary consists simply of cold water with a bucket of soluble oil added for lubrication.

This Meader pump has large dimensions, enabling easy handling of the material and has an unusual automatic valve gear.

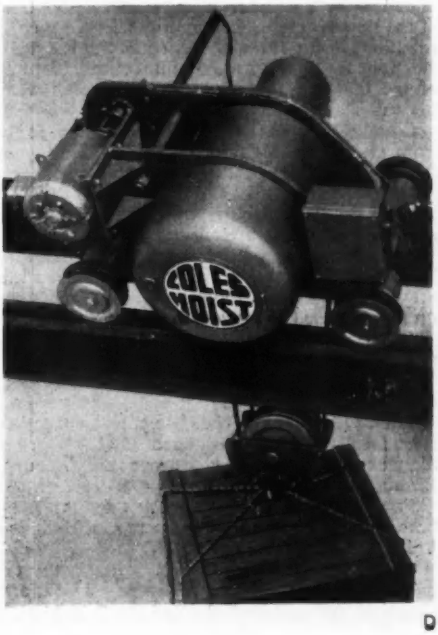
An Electric Travelling Crab by Coles

DEVELOPED by STEELS ENGINEERING PRODUCTS LTD., Crown Works, Sunderland, the new "Coles" electric crab is a compact unit. Its neat size has been obtained by extending the hoist sideplates to form a travelling carriage carrying runner axles mounted on ball bearings. Both travel gear and block are designed to traverse under extremely low headroom.

All the advantages of the "Coles" electric hoist are embodied in this unit. The powerful machine-cut gear train runs in a sealed oil bath, being continuously lubricated, fool and dust-proof.

The large diameter, grooved hoisting barrel takes a full length of rope in one layer with ample reserve of spare turns on the drum. Hoist rope is of best plough steel, with high safety factor. A rope guide feeds this rope accurately into the grooves on the hoisting barrel and prevents over-riding.

Coles Crab is a compact unit



Self-resetting limit switches can be readily adjusted to cut out in any desired position and positively prevent over-hoisting and over-lowering. An automatic electro-mechanical brake holds the load immediately the current fails or is cut off.

The crab can be operated by a push-button control suspended from the unit, from a fixed position, or from a control cab on the crane. Travel speed is 110 ft. per minute. For exact positioning of loads where a.c. power supplies are available, a special creeping speed attachment can be fitted, giving a hoisting speed of one-tenth of working speed according to the pay load.

There are 2-, 3- and 6-ton lift capacity models available in one-, two- or three-motor, double girder cranes for a.c. or d.c. supply. They are also readily adaptable for electrifying existing double girder hand cranes with approximately 26 in. beam centres.

Ekco's Transportable U.159

A NEW version of the successful U.122 has now been introduced by E. K. COLE, LTD., Southend-on-Sea, Essex.

All the principal features of the U.122 have been retained in this new a.c./d.c. transportable superhet receiver, but it now has a larger station name scale and an improved wave-change lever, together with a new colour scheme.

This five-valve model is light in weight (7 lb), neat in size and appearance (11½ in. by 6 in. by 9 in.), and equipped with a 6-in. p.m. dustproof speaker, has a pure tone and output excellent for a model of this type.

The wave range is 194-550 metres and 1,000-2,000 metres. Cabinet is a thermoplastic moulding in polystyrene with contrasting plastic grille back and front. Colour schemes are ivory with gold fret or dove-grey with white contrast. Price is £17 10s. inclusive of purchase tax.

U.159 is attractive in dove-grey and white

TRADE PUBLICATIONS

MOTORS IN THE HOUSE.—Bull Motors (E. and R. F. Turner Ltd.) of Ipswich, have issued "Heart of an Empire", a booklet giving a short description of the new House of Commons. Their own contribution, in the form of silent motors, is briefly mentioned in the course of an interesting account of the materials and craftsmanship which went towards the rebuilding.

COMPRESSORS. A new publication is available from G. and J. Weir, Ltd., Cathcart, Glasgow S.4. It describes the range of compressors for which the firm is famous.

LIFT EQUIPMENT. An attractive publication issued by Marryat and Scott, Ltd., Hounslow, Middlesex, is classed by them as a catalogue. With the title, "What happens when you press the lift push," the book is more properly a textbook on lifts designed to interest the layman.

CABLES. Feeder cables for television services are the subject of a folder issue by W. T. Henley's Telegraph Works Company, Ltd., 51 Hatton Garden, London E.C.1.

WATER HEATERS. The latest water heating price list W.H.1875 is now available from Simplex Electric Co., Ltd., Broadwell, Oldbury, Birmingham.

FURNACE EQUIPMENT. The heat treatment of bearing races is the subject of a reprint by Birlec Ltd., Erdington, Birmingham 24.

QUARTZ CRYSTALS.—G.E.C. quartz crystal units are listed in a new publication by Salford Electrical Instruments Ltd., Peel St., Salford.

RUST PROOFING. "The Bonderizer," a new venture by the Pyrene Company, Ltd., Great West Road, Brentford, is a monthly news-sheet publicising the virtues and applications of the metal finishing processes of the company.

FLAMEPROOF EQUIPMENT. Recent publications by Simplex Electric Co., Ltd., Broadwell, Oldbury, Birmingham, include three broad-sheets on flameproof lighting equipment.

SWITCH AND DISTRIBUTION GEAR. A new catalogue bound securely in red linen has been issued by Bill Switchgear, Ltd., Aston Lane, Perry Bar, Birmingham 20. It gives full technical information on the range of "Bill" switch and distribution gear.

TRUCKS AND TROLLEYS.—A new catalogue embracing a wide range of trucks, trolleys and baling presses, No. 62, has recently been published by The Angel Truck Co., Ltd., Albion Road, Stoke Newington, N.16.

CYCLE LAMPS.—Cycle dynamo lamps for 6 V supplies are made by Ekco-Ensign Electric Ltd. Southend-on-Sea, Essex. Leaflet CDL.51 gives details.

MERCURY ARC TUBES. A new publication from English Electric Co., Ltd., Queen's House, Kingsway, W.C.2, deals specifically with the types of mercury arc tubes available from the company.

MECHANICAL HANDLING.—The "Palatrucs" and "Palastacs" built by Matling, Ltd., 14 Ossington Street, London, W.2, are featured in an illustrated folder issued by the company.

THE PROPER TREATMENT FOR FACTORY VISITORS

1. Know the way.—Know how to get from the cost office to the toolroom without getting your feet wet or losing your guest.

2. Know the experts.—Nobody can expect you to know all about everything in a modern factory. Your visitor may be an American statistician or a West African bishop, and between them they can ask you practically anything. All you have to do is to be able to find the man on the spot who knows the number of threads on the turret lathe lead screw or the accident frequency rate in the dispatch department.

3. Know the time.—It is no good spending half an hour in the hydraulic testing department if that means only two minutes left for the rolling mill.

4. Know your visitor.—If he is interested in bus bodies, he wants to see them, however proud you are of the new degreasing plant; on the other hand, if he is a degreasing engineer, bus bodies won't interest him nearly so much. If he has a weak heart don't hurry him. If he's deaf—shout.

5. Know who speaks Greek.—The foreign visitors who have difficulty with their English are always delighted to meet anybody who can speak their own language to them. On the other hand, they will probably be hurt if they speak good English and you insist on talking bad Portuguese.

6. Know the Company's point of view.—Perhaps your visitor came to complain. Perhaps he's justified. Be careful not to take sides.

7. Let the foreman know.—If you can let the supervisors know beforehand whom you are bringing, they will make even greater efforts than usual to smooth your path. In any case, you should always introduce your visitor to the man in charge.

8. Be loyal.—Never speak slightingly of your company, your directors, your colleagues, your workmen or anyone else connected with the firm.

9. Don't be selfish.—You may be proud of your visitor. Do not let that prevent your introducing him to any colleague.

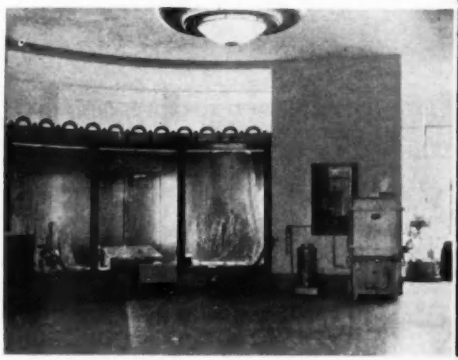
10. Be cheerful despite it all.—Nobody enjoys being led round a factory by a man with a long face and a continual grumble.

11. Make a report.

Abstracted from Training Booklet No. 3, issued by Tube Investments Ltd. to their staffs, and released for general publication through the British Association for Commercial and Industrial Education

S.W. Board's Exhibition

These three pictures illustrate the Health, Industry and Agriculture sections of the "Electricity in the Service of the Community" Exhibition being shown by S.W. Electricity Board at Bristol. A special view for members of the Board's Staff was held on Tuesday, July 10th and was attended by over 170 people. The Exhibition will close on July 28th.



THE WEEK

COMMERCE *in news* INDUSTRY

Radio Sales back to Normal

FOLLOWING the abnormal fluctuations in the sales of radio and television sets during the budget period, figures returned to more reasonable proportions in May according to the R.T.R.A. index for that month just published. Readers will recall that April figures rose due to heavy buying at pre-budget prices. The apparently sharp fall is, therefore, not remarkable when that fact is considered jointly with the seasonal decline in buying. The average number of sets sold per shop is as follows:

Month	1951	1950
Radio		
April	17·26	8·91
May	8·35	8·92
Television		
April	15·62	5·18
May	6·43	6·32

Street Works Acts

THE Ministry of Transport has published a booklet, priced at 1s. 6d., containing notes on the Public Utilities Street Works Act of 1950. These notes are intended as a guide to the Act and deal with its provisions in consecutive form avoiding the frequent cross-references mentioned in the Act itself. A point of interest is that many of the chapters open with a summary, and thus a general outline of the Act may be gained by reading paragraph "A" of each chapter in the notes. The booklet is obtainable from H.M.S.O.

Loss due to Electricity Charges

A LARGE proportion of the financial loss sustained by Bradford Passenger Transport Department last year has been attributed to the high cost of electricity. The loss was about £20,000 and the report issued recently states that the department is paying much in excess of other transport authorities in the area. Last year's electricity bill amounted to £100,000.

Cooking Apparatus—Trading Code

EIGHT manufacturers of heavy duty cooking apparatus have announced the basis under which they will operate their Trading Code until further notice. The manufacturers concerned are Carron Co., Inc., Crittall Kitchen Equipment Co., Ltd., Falkirk Iron Co., Ltd., Gardiner and Gulland, Ltd., the G.E.C., Ltd., Jackson Electric Stove Co., Ltd., Simplex Electric Co., Ltd., and James Stott and Co. (Engineers) Ltd. They advise customers firstly that list prices will be at the discretion of individual manufacturers. Contractors, retailers quantity users and public utilities may be granted a discount not exceeding 10% off list prices at the manufacturer's discretion. A similar discount with further discount not exceeding 5%, may be granted to those same bodies if they display heavy duty cooking apparatus (within the scope of the Code) in showrooms, and employ personnel specalised technically in the marketing of that equipment. Fourthly, settlement terms may be granted if payment is made before the end of the month following the month of delivery. These terms will be limited to 2½%. A final point in the announcement states that no equipment covered by the Code will be supplied on "sale or return" or, in general, on "rental" terms.

Seeboard meets E.C.A.

WHAT may be termed as a conference of rivals took place last week at Brighton when the S.E. Electricity Board, its sub-areas and districts, met the Electrical Contractors' Association. The meeting provided an excellent opportunity for both sides to get to know each other better and to know those with whom they should make contact on mutual day-to-day problems. Mr. W. R. T. Skinner, deputy-chairman of Seeboard, presided. Apart from many of their members in the S.E. area, the E.C.A. was represented by its president Mr. S. N. Watkins and its past-president Mr. P. G. Wallis. Papers were read by Mr. Wallis and Mr. M. W. Hime, section head of the Board's commercial department. After lunch, attended by nearly 200 delegates, over £16 was collected for the E.I.B.A.

The First Half-Century

Mr. Ferranti, on behalf of the contractors, reported on the break-down at West Ham and said he felt pretty certain that the damage was wilfully caused. One of the breakdowns was in the armature coils, a thing which rarely happens with Ferranti machines. Another time, after running successfully for a considerable period, the oil ways to both guides to the engine were found to be stuffed with hemp, a material not used in connection with a machine. A serious matter also was the placing of two bolts in the gear box, whereby the valve gear was injured.—*From our issue of* 18 *July*, 1901.

Trainees see Electrical Industry

VISITORS from eight European countries and the Gold Coast taking part in a fortnight's British Council course on technical engineering training in Glasgow, took the opportunity during their stay to visit many industrial centres, including a number of electrical firms, power stations and institutes. The factory of Babcock and Wilcox, Ltd., the North of Scotland H.E. Board's training college at Pitlochry and the Loch Sloy scheme, and the Exhibition of Industrial Power were on their itinerary in Scotland. On arrival in London they were guests of I.E.E.

Hurlingham Ball Floodlit

TWO thousand or more delegates to the 1951 International Advertising Conference were entertained by a gay display of lighting when they attended the Hurlingham Ball and Starlight Garden Party last Wednesday. As a contribution to the event the British Thomson-Houston Co., Ltd., supplied 120 floodlights, over 1,000 ft of "fairyland strip" and numerous spotlights and fittings. The illuminations seemed to dominate the evening —in the Beer Garden between the dancing and buffet marquees, trees were floodlit, garden borders were accentuated, a background of flags was floodlit and the swimming pool and lake also glowed under the bright spotlights.

Causes and Remedy

AN explanation of power cuts which have occurred in the north after May 21 was given by the Northern Regional Board for Industry recently. This was believed to be the first detailed explanation given. Reasons were said to have been the breakdown of electrical plant at Dunston power station and trouble with generating plant at Glasgow, Carlisle and Hull, which restricted the import of power from the grid system.

Following the Board's monthly meeting it was suggested that to cut load shedding additional power plant should be produced by firms not already fully absorbed on the plant programme. Such plant, the Board proposed, could be accommodated at existing power stations or, if necessary, in temporary buildings.

The midnight swim show and aquaen cabaret brilliantly illuminated by B.T.H. at the Hurlingham Ball last wee

George Montefiore Awards

WE hear that towards the end of last month the George Montefiore Foundation Committee met again in Liege to consider awards. M. George Montefiore was the founder of the Electrotechnical Institute which is attached to the town's University, and bears his name. He left a large sum of money in his will to the Association of Electrical Engineers for awards to past students of the Institute in recognition of some outstanding work or advancement in the electrical field. The prize is awarded every five years and at the discretion of a committee of 10, representing a number of countries besides Belgium, all of whom are prominent figures in the industry. Members include Mr. C. W. Marshall, deputy chief engineer of the B.E.A., and engineers from Sweden, France and Holland. Seventeen entries were submitted in the 1950 competition but none of these was British. Four awards were made.

Showrooms are Profitable

BY increasing the number of their showrooms in Birmingham, the Midlands Electricity Board anticipated that electricity charges would be reduced because each showroom the Board possessed at present showed a profit. Mr. Emil Braathen, Birmingham sub-area manager, pointed out this fact to Sutton Coldfield Housewives League recently when asked if the alteration and

Following our reproductions of floodlighting schemes in Britain we have to hand this week a photograph of an impressive installation from another country whose capital is also in the throes of celebrations. This picture comes from Paris on the occasion of her bi-millenery and taken from the Tuileries Gardens shows the Place de la Concorde. On the left is the Obelisk, and the buildings in the background are the Hotel Crillon and Ministry of Marine

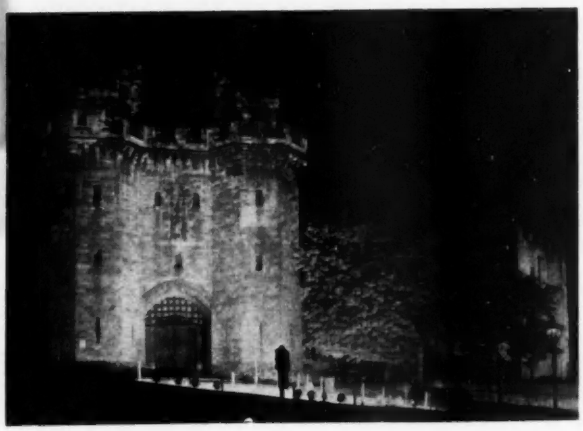
"beautifying" of service centres in most districts had not proved wasteful. He added that when he went to Birmingham there were only six centres, but no fewer than 50 were needed in the district now. As if to support Mr. Braathen's view to some extent, we learn that the M.E.B. has bought a former restaurant in Castle Street, Dudley, as a new showroom at a cost of £30,000.

Large Norwegian Order

THE largest single order awarded by the Norwegian broadcasting authorities has just been placed with Marconi's Wireless Telegraph Co., Ltd. It is for a 200 kW long-wave installation in Oslo and consists of two 100 kW transmitters in parallel which are in the new range of air-cooled equipment recently designed by the company and which have been successful hitherto in gaining orders from Finland, Denmark and Argentine. Such an installation, incidentally, was opened by the B.B.C. at Daventry a short time ago for our Third Programme. Besides dispensing with the large reservoir needed with water-cooled valves, these new transmitters also effect a saving of space, building and maintenance costs.

Improved Lighting in Bombay

DURING the past year about 500 street lights have been installed along some 12 miles of Bombay's roads as part of a major lighting improvement scheme undertaken by the Electricity Supply Department of Bombay. The first part of the scheme was completed recently when two installations consisting of 175 "diffractor" lanterns for 250 W mercury lamps were inaugurated. These lanterns have been mounted on steel columns and control gear has also been affixed to the head of the posts in weatherproof boxes. Side roads have been lighted with 80 or 125 W mercury lamps. A further 750 lanterns of the same pattern, together with 76 suitable for fluorescent lamps, will comprise the second part of the scheme. All the lighting equipment has been supplied by the G.E.C. and carried out by the Municipality's electricity undertaking.



A view of Lancaster Castle floodlit by the N.W.E.B. as part of the North's Festival celebrations. It is one of four installations carried out by the Board among the city's historic buildings

Floodlighting in Lancaster

FLOODLIGHTING of four famous buildings in Lancaster has been an impressive contribution towards the Festival celebrations by the N.W. Electricity Board. The buildings involved are the Castle, Priory and parish church, town hall and the Ashton Memorial in Williamson Park, the total cost of the schemes being just over £2,000. It is probable that few monuments of history in the north of England lend themselves more suitably to floodlighting and all but the town hall can be seen for miles around on a clear night. The floodlighting will continue from dusk until midnight between now and the end of September.

Industrial Art Bursaries—1951

DOMESTIC electrical appliances, introduced last year, will again be included among the sections in the Royal Society of Arts Industrial Bursaries Competition for 1951. Thus, young designers in the electrical field will again enjoy the opportunities of two sections—the second being electric light fittings. A bursary of £150 is being offered to the winning candidate in each section, and in addition associate membership of the Society will be awarded without subscription to winners under the age of 21. The competition is open to full-time, part-time and evening class students between the ages of 17 and 30 who intend to take up industrial design as a career. We remind prospective candidates that entry forms should be submitted to the secretary by October 15. Total value of bursaries offered this year is £2,100, which compares very favourably with last year's total of £1,705.

A Rationing Scheme

A SCHEME is being considered by which Merseyside housewives next year may be given the alternative of dispensing with their electric cooker or fire, whichever is the more convenient. The scheme is intended to do away with total power cuts in certain districts during peak hours. The Merseyside and N. Wales Electricity Board has in hand plans for the rationing of domestic supply, which will involve the installation of a governing relay system in the domestic circuit. Each household would be rationed to a definite number of kilowatts at peak periods and the housewife would have to decide to what use she put her ration.

Mr. J. Eccles, chairman of the Board, has said, however, that he wants the whole-hearted support of

Left is a view of the showroom which forms part of the new Liverpool premises of Jackson Electric Stove Co., Ltd., and right is a corner of the English Electric Co.'s new demonstration kitchen opened in London recently

consumers. The Board would not operate the scheme unless it was agreed to by the public. The main problem in affecting such a large-scale rationing scheme was the fixing of the control units in some 600,000 households.

Two new Showrooms Opened

A NEW branch office has been opened in Liverpool by Jackson Electric Stove Co., Ltd. These premises will serve both the N.W. and Merseyside and N. Wales Electricity Boards and is situated at 60a Bold St., Liverpool 1. The offices also contain a large showroom, a feature of which is a kitchen demonstration platform.

Women who crave after their dream kitchen may find what they are looking for at the new showroom opened by the English Electric Co. at their Kingsway (London) premises. Open to both the public and retailers the showroom incorporates the company's ideas on equiping the kitchen, and a comprehensive selection of their latest appliances has been employed to this end. It was designed specially to show what could be achieved by using available floor space to the best advantage. Qualified demonstrators are in attendance each day.

Silver Jubilee

STARTING in the pioneer days of radio's infancy, E. K. Cole, Ltd., this year celebrate their silver jubilee. To mark this milestone in history, the company's shareholders received their annual report and balance sheet in a more colourful form than usual—tucked in a pocket inside an attractive brochure. The booklet contains a brief review of policy, the chairman's report and in its latter pages illustrations with suitable captions telling the story of progress both at home, overseas, and in the many applications where radio today is essential.

Seventieth Anniversary

A NOTABLE event which we feel bound to record is the seventieth anniversary of Falk Stadelmann and Co. Like so many of the company's contemporaries, it began in a small way, with two rooms in Basinghall St., London, hardly comparable with its head office now situated in Farringdon St., its London showrooms and branches in many provincial towns and overseas. This expansion into a world-wide concern is the more remarkable because, again like many of their contemporaries, Falks suffered at the hands of the Luftwaffe. To commemorate the occasion, Falks have produced a small leaflet depicting some of their products, and extends a cordial invitation to all to visit their Mount St. showrooms.

Four-year Course in Electronics

LAST January E.M.I. Institutes Ltd. inaugurated a four-year course in electronics, to which was associated a scholarship scheme, in order to cater for the increasing need for highly trained electronic engineers. The company intends to hold the courses and scholarship schemes annually, the commencing date being in August to coincide with normal school-leaving periods. This year's course will begin on August 27. Candidates should be over 17 years of age and have reached inter-B.Sc. level in mathematics and physics. Applications to The Principal, E.M.I. Institutes, 10 Pembridge Square, W.2.

Midlands Golf Championship

WE learn that the Midlands Area final of the Electrical Industries National Golf Championship has been arranged to take place at the Edgbaston club on August 22. The competition is, of course, in aid of E.I.B.A. funds. For the Midlands event there is the Railing cup for the winner and the runner-up will receive the Jacob cup. Qualifying score cards are available at 2s. 6d. each from the secretary, Mr. G. Redmond, at Albion Buildings, 4 Vesey St., Birmingham 4, and should be returned to him by August 4.

Bungalow for E.I.B.A.

A GIFT of a bungalow to the E.I.B.A. by the Electrical Contractors' Association to mark their golden jubilee was reported at the Court of E.I.B.A. last week. The bungalow is to be built in the grounds of Broome Park, at Betchworth (Surrey), run by the Association as a home for retired people, and will be occupied by beneficiaries in need of a prolonged spell of convalescence from tuberculosis or other serious maladies.

Our picture was taken at the annual sports of Metropolitan-Vickers Electrical Co., Ltd., held at Fallowfield and shows Mrs. I. R. Cox who had just presented a handsome trophy to the winning group in the keen inter-departmental group competition. There were nearly 3,000 spectators at this year's sports meeting

Social Brevities

STAFFORD works of the English Electric Co. held their Open Day recently, and although no official attendance figure has been recorded, families and friends were said to have entered the factory at a rate of 20 a minute as soon as the gates were opened. The tour included the large erecting shop and Nelson Research Laboratories, and each visitor received a brochure detailing products made by the company. Staff of British Central Electrical Co. enjoyed their annual outing this year at Brighton. Four planes are being chartered to take Bailey Meters and Controls Ltd.'s employees to the Isle of Wight for their outing. When the 1,000 or more employees of Oldham and Son, Ltd., went to Blackpool for the day, each employee received a gift of 12s. 6d. as spending money. In addition, everyone had admission tickets to various places of amusement. There were over 50 keenly contested events at Telcon's seventh annual sports meeting. An addition to the programme was a tug-of-war with Johnson and Phillips, which the home team won. Prizes were presented by Lord Colgrain, chairman of Telcon.

From Crecy to a Power Station

A ONE-EDGED sword complete with hilt and guard has been found on the site of the new Bankside power station. We learn that excavations have brought to light a number of relics of medieval England, and the latest find is believed to have originated in the fourteenth century, about the time of the Battle of Crecy. The Tower of London has nothing like it among the collection there, but the sword's disposal depends on the B.E.A., the legal owners.

Preview of "The Abbey"

THROUGH the courtesy of D.A.T.A. (Documentary Technical Alliance Ltd., of 21 Soho Square) we were privileged to view two documentary films of the Abbey Works (Steel Co. of Wales Ltd.) which provided valuable background for Tuesday's official opening. The films in question are the first and last of a series of four which D.A.T.A. have made of the scheme, by way of progress reports. The first, "Plan for Steel," shows the initial ten months from the drainage and clearing of the marsh land to the erection of the first steelwork, while the other, "From Plan into Action," shows the initial operation of the new Margam No. 2 blast furnace and the slabbing mill at Abbey in production. Produced by Donald Alexander, both films possessed the quality of the true first-class documentary.

B.A. at Edinburgh

DETAILS were announced last week of the programme for the British Association 1951 meeting, which is to be held in Edinburgh from August 8 to 15, with H.R.H. the Duke of Edinburgh as president. Chairman of Section G—Engineering, this year, is Sir Claude Gibb (chairman and managing director of C. A. Parsons) and he will deliver his address on August 10, the subject being "Two Thousand Years of Engineering." Other papers of special interest to electrical engineers include "The Use of High Ash Coals in the Electricity Supply Industry" (Dr. A. Alan Taylor); "The Design of Large Boiler Plant for Using High Ash Coal" (G. W. Marskell); "Hydro-electric Schemes—Modern Trends in Civil Engineering" (Mr. T. A. L. Paton); "Water Turbines for Hydro-electric Projects" (Messrs. R. W. Weekes and A. Feiner); "The Development of High Voltage Power Transmission" (Mr. T. G. N. Haldane); and "Electrical Aspects of Modern Hydro-electric Development in Scotland" (Mr. T. Lawrie).

L.E.B. and Graduate Trainees

THE London Electricity Board's Graduate Trainee's Association, which has now been running successfully for over a year, is planning a further full programme of lectures, visits and social functions for the future. The object of this organisation is to afford facilities for training in all matters relating to the distribution of power within the Board. The Association will welcome members not only in its own area but also from other Area Boards and the Central Authority. Particulars may be obtained from the Hon. Secretary at 46 New Broad St., London E.C.2.

NEWS IN BRIEF

The National Federated Electrical Association has published the 1951 edition of their "Industrial Agreements and National Working Rules." Copies are available from the Association priced at 1s. 6d. to members and 2s. 6d. to non-members.

Following experiments in Yorkshire on radio signals for power cuts we learn that London factories are considering similar installations.

Work has begun on the erection of a large design and research building for C. A. Parsons and Co., Ltd., of Newcastle-on-Tyne.

Following an official statement that the Pontop Pike (Durham) TV station would be suspended in the interests of the defence programme, Chambers of Trade in the N.E. are being circularised to approach their M.P.s on the issue.

It is understood that the Association of Municipal Corporations are making representations to the Ministry of Fuel and Power that local councils should have direct approach to the consultative councils of public utility undertakings regarding charges for services. Some months ago, the Tynemouth T.C. complained that the N.E. Electricity Board had raised certain electricity charges without prior agreement with the Council.

It is regretted that in our report last week (p. 87) on the electrocution of a Berwickshire farm steward, we inadvertently referred to the claim being made against the S.W. Scotland Electricity Board. This should have read S.E. Scotland Electricity Board.

Questions in Parliament

Atomic Generation

Mr. George Strauss was asked if he would give an estimate of the relative cost of generating electricity by present methods compared with the cost if generated by atomic power, and of the saving in coal. Replying he said it was too early to make any reliable estimate, but there was a reasonable prospect that generation by atomic power could be developed on a large scale. Ultimately the cost would not differ greatly from that of power from conventional sources. Relative cost would vary from place to place according to the local availability and cost of coal, consequently generation from atomic energy was likely first to be advantageous in particular places.

The Minister also stated that considerable progress had been made in the planning of nuclear reactors for use as power units, and in the development of the necessary facilities for investigating materials for use in such reactors. Progress had also been made in the technology of special materials required for reactor construction, and design studies of experimental reactors for marine propulsion and for static use were in hand.

B.E.A. Building Projects

Further licensing of work for the B.E.A. other than the £400,000 worth already authorised would not be permitted unless there were "special" circumstances or if the offices were an integral part of industrial establishments, said the Chancellor of the Exchequer in reply to questions by Mr. Boyd-Carpenter. The latter asked whether the ban on the building of offices extended to Government offices and those for nationalised industries. He particularly cited the B.E.A.'s case.

Domestic Consumption

Measures were being considered whereby the peak-load demand for electricity during the winter months would be reduced said Mr. Noel-Baker. When asked if he proposed to introduce legislation to secure a substantial reduction in domestic use he would not commit himself. He agreed with the suggestion that electricity would be saved by the distribution of more coal and added that more solid fuel was available.

Fuel Policy

As the whole field of fuel and power policy was under constant review, and its innumerable aspects required separate consideration, no useful purpose would be served by attempting to make a comprehensive statement on the subject, said Mr. Noel-Baker, when asked whether the Scientific Division was formulating a fully co-ordinated national policy for fuel and power industries. The Minister added that he hoped to announce shortly the names of the special committee being set up to investigate the wider aspects of such a policy. The committee would be asked to submit interim or final reports as they thought fit.

Generating Plant

The Minister of Fuel and Power was plied with numerous questions last week, on generating capacity, capital expenditure and delivery dates of new plant. Restrictions on capital expenditure had not as yet delayed the commissioning of new plant, he said, and investment in electricity was increasing each year. Every effort was being made to speed up the commissioning of new plant. Asked how generating capacity this year compared with what was expected during 1950, the Minister said the largest increase pre-war was 765 MW, in 1947 it was 340 MW and last year 960 MW. This year it would be more. In regard to delivery, the Minister replied that it was a matter for the manufacturers, but a department of the B.E.A. worked in close liaison with the makers and in fact deliveries had much improved since vesting day.

In reply to further questions concerning the effects of raw materials shortages on supply of plant and new power station sites and whether in view of Lord Citrine's recent statement supplies would be diverted for other purposes, Mr. Noel-Baker said special cases would be eligible for preferential treatment as announced by the Chancellor of the Exchequer last month. It was hoped that a good supply of new capacity would be maintained.

Hydro-Electric Schemes

Sir Ian Fraser sought an assurance from the Minister of Local Government and Planning, that if the B.E.A. proposed Hydro-Electric schemes in the area of national parks, full publicity would be given to the project so that local feeling might be consulted. Replying, Mr. Dalton said that before embarking on any such scheme the B.E.A. had first to obtain permission from the Ministry of Fuel and Power, who in turn had to authorise the presentation of a Bill. Even when the Bill was presented there were still many opportunities for opposition still remaining. Mr. Ellis Smith then asked if in view of our serious economic needs the

Minister would do nothing to impair the production of power. To which Mr. Dalton replied that one project had to be balanced against another.

Power Sources (Scotland)

Replying to a question by Mr. McInnes, the Secretary of State for Scotland said he was aware that the Scottish Council (Development and Industry) recently decided to appoint a committee to inquire into power supplies and industrial location. There were, of course, several boards of socialised industries and other official bodies which were concerned with the development of power of all kinds and its supply to industry, but he was sure that every effort would be made to see that the inquiry which the Scottish Council proposed would not duplicate any part of their work.

T.U. on Consultative Councils

Asked if he would strengthen the South Western Electricity Consultative Council by inviting trade unions in the region to nominate representatives to sit on that body, Mr. Noel-Baker replied that there were two trade union members serving on that Council at the present time. The T.U.C. was one of several national bodies from whom he had invited and received nominations when considering making appointments to the various Electricity Consultative Councils.

Electric Supply News

North of Scotland

Maj. Duncan M'Callum, M.P. for Argyll, has asked the N. of Scotland Hydro-Electric Board to speed up the extension to electricity supplies to Salen on the island of Mull. Houses there were wired for electricity three years ago. The delay was said to have been caused by the shortage of materials, but it was hoped to complete the work soon.

Northumberland

Opposition is increasing to the proposed route of 275,000 V grid line planned by the B.E.A. between Stella, near Newcastle, and Carlisle, which roughly follows the Roman Wall. Last week Hexham R.D.C. decided to support the Northumberland county planning authority in its request for a public inquiry. The county's planning officer stated that the Ministry of Agriculture preferred another route and various Tyneside associations opposed the plan together with the National Parks Commission. The alternative route suggested was well south of the Tyne and was estimated to cost about £72,000 more than the northern line.

One member of the Council, commenting that the controversy hinged on the comparative value of electricity to the community and the effect of pylons and cables on the amenities of the Roman Wall, remarked that this scheme was going to be an asset to farmers and rural districts.

North Eastern Board

A quarterly progress report submitted by the Board last Monday stated that during the period under review the Board had approved estimates amounting to £716,237, covering 132 schemes. These included 67 housing and 22 farm schemes. New substations put into operation included nine in the Tyne sub-area, 13 in the Wear area, 14 in the Tees area, eight in the Harrogate area and seven in the York area, while a total of 33 new substations were now in operation for farms and villages. In addition, h.v. supplies were afforded to 23 industrial and commercial users. Eleven villages had also been brought on supply.

Orkney

The North of Scotland Hydro-Electric Board has started a preliminary survey of work in connection with the provision of electricity supply to two of the Orkney's south islands, Burray and South Ronaldshay. These two islands are now connected to the Orkney mainland by the Admiralty road causeway.

LIGHTING SCHEMES

Caterham and Warlingham (Surrey). The U.D.C. has been recommended to approve a scheme for the installation of electricity along Limpsfield Rd. at a cost of £2,323.

Newry.—At its meeting last week the U.D.C. adopted in principle a proposal that the fluorescent lighting scheme in the town be completed at an estimated cost of £28,164. At present the town is lighted by 300 gas and 40 electric lamps.

Sutton-at-Hone (Kent).—The Parish Council has agreed to proceed with the first of six sections of a scheme to switch over from gas to electric lighting at Swanley. The first and largest will provide for 102 street lamps at a capital cost of £1,568.

Wallsend.—An application has been made to borrow £2,345 for street lighting on the Low Willington Farm estate. The scheme provides for 73 lamps.

Wellingborough.—The U.D.C. has received approval for a street lighting scheme proposed for Wollaston.

West Hartlepool.—The town council is to carry out a street lighting improvement scheme estimated to cost a total of £8,870.

Weymouth.—The Town Council has approved a scheme for lighting the esplanade. Cost of the project is estimated at £3,000.

Wigan.—A resolution from the Streets Lighting Committee has been carried for conversion of street lighting on traffic routes at a cost of £3,337, and lighting of housing estates costing £4,247.

Company Activities

British Industrial Plastics

Of the 2,500,000 2s. ordinary shares offered by the company at 5s. each, 2,144,680 shares have been allotted by way of right. The remainder have been allotted on a proportional basis.

Charles Churchill

Consolidated trading profit to March 31, £570,702 (*£410,906*) After tax £*288,787* (*£145,840*) etc., the balance is £194,524 (*£200,758*). To reserves is placed £147,151 (*£172,334*). To ordinary dividends £35,625 (*£20,625*) leaving carry forward of £87,955 (*£80,774*).

Dubilier Condensers

Net profit for year is £70,421 (*£64,194*) after taxation of £96,660 (*£61,700*) and the credit of £2,078 (*£15,887*) tax over – provision. General reserve receives £50,000 (*£50,898*) and after deduction of £18,181 (*£13,967*) for dividend carry-forward is £84,860 (*£82,620*).

E. K. Cole, Ltd.

As announced in preliminary statements the group net profit is £155,050 (*£100,681*). Trading profit increased by £210,698 to £514,740 for the year. The figure for net profit was found after expenses on issue of loan stock of £8,000 (*nil*), discount on issue of loan stock of £6,000 (*nil*), and interest on £8,901 (*nil*). £100,000 (*£50,000*) has been transferred to general reserve and a transfer of £40,000 to the reserve for employees' supplementary pensions has been made. Deductions for dividends amount to £44,597 (*£39,936*), whilst the carry-forward is £130,444 as against £159,991 brought in. Total assets now stand at £3,312,122, an increase of £576,284 on last year's figure. Current assets are £2,812,786 (*£2,195,043*).

Geo. W. King

Gross profit for year is £103,057 (*£84,370*). Taxation takes £56,630 (*£44,655*), special expenses of £1,377 (*£9,957*) and provision for excess profits tax for earlier years of £7,513 (*nil*), leave a net profit of £37,537 (*£28,495*).

Lightfoot Refrigeration

Actual earned profit was £68,779 (*£73,796*). Net dividends receivable from subsidiary companies show a reduction of £989, whilst depreciation of fixed assets has been increased to £16,121 (a rise of £2,095).

Mexican Light and Power

Consolidated gross operating revenue for quarter ended March 31 in Canadian currency is $6,192,499 (corresponding quarter, 1950, $*5,595,902*). Operating expenses, including taxes and depreciation, $5,098,433 ($*4,897,011*). Net operating revenue $1,094,066 ($*698,891*). Charges on funded debt and construction loans $455,197 ($*412,260*).

National Gas and Oil Engine

The directors have received an offer from Brush Electrical Engineering, the majority shareholders, of 32s. per share for the balance of 226,950 £1 ordinary shares held by minority interests. Brush already hold 60% of the issue.

Oldham and Son

Net profit for year £265,179 (*£210,161*) before tax £154,610 (*£108,551*). Transferred to general reserve is a sum of £65,000 against *£75,000* for previous year.

Oldham and Son (Africa)

Trading profit for year £52,686 against *£44,405* for 14 months up to March, 1950. Preliminary expenses of £5,000 (*nil*) and taxation £13,200 (*£10,350*), and a dividend of 7½%, £22,500, leave £15,366 (*£8,075*) to be carried forward.

Tilling-Stevens Ltd.

Consolidated trading loss, after charging depreciation, is £12,950 (*£31,027*), plus prototype expenditure written off £22,690 (*£27,184*), off research nil (*£5,058*), off obsolete and redundant stock £116,912 (*nil*), making an aggregate loss of £152,552 (*£63,269*). Deduct adjustment of prior years' taxation £15,991 (*nil*), and transfer from reserves etc., nil (*£37,392*), and to profits tax £1,200 (*nil*). After crediting £51,360 brought forward and £125,000 from general reserve, there is £38,599 available. Eight months dividend on 5% Preference to March 31, 1951, takes £4,034, leaving £35,565 carried forward. These are the first accounts following the capital reorganisation and acquisition in September, 1950, of the issued Ordinary capital by Humber (a member of the Rootes Group).

Waite and Son

For the year to March 31, a profit of £51,603 (*£33,138*) is reported by this lampshade and standard firm. Taxation takes £29,245 (*£13,837*), loan redemption reserve £4,000 (*same*), to general reserve £9,000 (*£8,000*), pensions reserve £2,000 (*same*), there is an ordinary dividend of 10% (*same*), plus bonus 5% (*nil*), leaving £5,474 (*£3,628*) carried forward.

Dividends Declared

Dubilier Condensers.—Ordinary dividend of 20% less tax (on increased capital) which is the same as last year.

Electric and General Investment Co.—Ordinary dividend 15% (*same on smaller capital*). Net profit £8,652 (*£6,631*).

Oldham and Son.—Dividend of 15% payable on August 17, making total of 30% for the year. This compares with a dividend of 10% making a total of 25% for the previous 10 months.

Pinchin Johnson.—Dividend of 17½% (*same*) making a total of 25% for the year (*same*).

Tilling-Stevens, Ltd.—Dividend on 5% Cumulative Preference shares will be paid in respect of six months ending July 31, 1951, on that date.

Traction and General Investment.—Interim dividend of 4% announced for payment July 31. Corresponding dividend last year was 2½%.

Commercial Information

CONTRACTS OPEN

HOME

July 20.—Plymouth. Installation of electric lighting and power circuits in slaughterhouse and meat market. J. Paton Watson, City Engineer and Surveyor, City Engineer's Office, Guildhall. Deposit £2 2s.

July 20.—Sheffield. Electrical installation at Jordanthorpe secondary technical school. Applications to W. Geo. Davies, City Architect, Town Hall. Deposit £2.

July 21.—Dunbarton. Provision, erection and wiring of 89 street-lighting columns on trunk road A.82. Includes 83 concrete columns, four ornamental cast iron columns and two wrought iron brackets, with sodium lanterns and time switches. Applicants should communicate by above date with William T. Samson, 124 Bridge St., Alexandria, Dunbartonshire. (See July 5 issue.)

July 21.—N. Ireland. Supply and installation of underground cable system and electrical switchgear at Whiteabbey Hospital for N.I. Tuberculosis Authority. Applications to W. Harvey, Secretary, 27 Adelaide St., Belfast. Deposit £3 3s. in each case.

July 21.—Manchester. Electrical installation at evening school of domestic economy. Wilmslow Rd. City Architect, Town Hall. Deposit £1 1s. (See July 5 issue.)

July 23.—Carlisle. Electrical installation in 42 houses. City Engineer and Surveyor, 18 Fisher Street.

July 23.—Goole T.C. Installation of H.P.M.V. sodium and tungsten Class A and B lighting on various roads in the borough. Thomas Waterfall, Borough Engineer, Municipal Offices. Deposit £1 1s. (See July 12 issue.)

July 23.—Inverness T.C. Rewiring of New Market Hall and Fish Market, and also rewiring of Slaughter House. J. Blackburn, burgh architect, 11 High Street.

July 23.—Norwich. Supply of one small electrically driven compressor set. S. N. Kelly, Engineer and Manager, Water Dept., City Hall.

July 23.—Nottingham. Improved lighting scheme along 2,150 yd. of trunk road A.52 comprising concrete columns and 140 W sodium equipment. Lighting Engineer, 3 George St. Deposit £2 2s. (See July 5 issue.)

July 24.—Denbigh T.C. Lighting is included in improvement works at Town Hall. Borough Surveyor, R. Alwyn Roberts, Council Offices. Deposit £2 2s.

July 24.—Epping U.D.C. Supply and erection of 46 concrete standards with sodium-type equipment for street lighting improvements. Council's Surveyor, J. H. Mead, 91 High St. (See July 5 issue.)

July 25.—Dublin. Supply of 5,000 ft 3-in galvanised conduit tubing (welded), 400 140W sodium lamps, 25,000 yd 3.029 weatherproof cable. City Engineer's Office, 28 Castle Street.

July 25.—Thurrock U.D.C. Provision and erection of street lighting columns, lanterns and fitting in various streets, totalling about 10 miles. Engineer and Surveyor, C. S. H. Hawkes, Council Offices, Palmer's Ave., Grays. Deposit £1 1s.

July 26.—Liverpool. Installation of electric light and power wiring at Sefton General Hospital for S. Liverpool Hospital Management Committee. Applications to Secretary, Garnet Chaplin, Sefton General Hospital, Liverpool 15.

July 27.—Glenrothes. Electrical installation in 170 houses and flats in course of erection at Woodside. Names of applicants to Secretary of Glenrothes Development Corporation, Woodside, Glenrothesby Markinch, Fife, by above date. Deposit £2 2s.

July 28.—Bridgwater. Supply and installation of 12 concrete columns and sodium lamps in St. John St., and 11 concrete columns and sodium lamps in Parkway. Tender forms for each work from Borough Engineer, Town Hall, on deposit of £2 2s.

July 28.—Esher U.D.C. Provision of 19 electric water heaters in houses at West Molesey. Engineer and Surveyor, Council Offices. Deposit £1 1s.

July 30.—Newbiggin-by-the-Sea U.D.C. Provision and erection of 95 standards, lamps and auxiliary equipment on roads A.197, B.1334 and other streets in the district. H. Selby Robson, Engineer and Surveyor, Council Offices. Deposit £2 2s.

July 31.—Durham. Electrical installation in Hartlepool West View new county school. Applications to County Architect's Office, Court Lane, Durham.

July 31.—Scunthorpe T.C. Supply and erection of 21 concrete columns and wiring of 42 400 W mercury discharge lanterns along approx. 1,955 yd of Ashby High St. Cyril Cooper, Borough Engineer and Surveyor, Comforts Ave., Scunthorpe. (See July 12 issue.)

Aug. 1.—Stoke-on-Trent, T.C. Supply of electric lamps required during six months ending March 31, 1952. City Surveyor, Town Hall.

Aug. 2.—Swinton and Pendlebury T.C. Supply and erection of electrically driven centrifugal pump capable of 1,000 g.p.m. Borough Engineer and Surveyor, Town Hall, Swinton, Lancs.

Aug. 3.—Belfast. Supply and erection of a 6-ton travelling lifting, semi-Goliath, manually operated gantry for handling circulating water screens, for Electricity Dept. Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (See July 5 issue.)

Aug. 4.—Reigate. Supply and installation of two sludge ejectors with electricity driven air compressors, starters, etc. George Sanderson, Borough Engineer and Surveyor, Town Hall.

Aug. 4.—Swansea T.C. Electrical installation in 148 houses at West Cross. Applications by above date to Borough Architect, The Guildhall. Deposit £2. (Advertised in this issue.)

Aug. 8.—Manchester. Electrical installation at Poundswick county primary school, Wythenshawe. City Architect, Town Hall. Deposit £1 1s. (Advertised in this issue.)

Aug. 13.—Southport T.C. Installation of class A sodium

lighting along five roads and class B filament lighting along 30 roads. Lighting Engineer, 117-123a Shakespeare Street.

Aug. 13.—Stepney. Installation of lighting, heating and power points in 77 dwellings at Vallance Rd. Borough Engineer and Surveyor, Municipal Offices, Duval St., E.1. (See July 12 issue.)

Aug. 15.—Cumnock and Holmhead T.C. Supply and erection of lamps, lanterns, controls, wiring, etc., for 44 lighting points on trunk road A.75. Burgh Surveyor, Town Hall, Cumnock.

Aug. 17.—Belfast. Supply and erection at Victoria power station of 3,300 V 150 MVA air or oil break switchgear, 400 V, 15 MVA air break switchgear, 400 V fuse gear and accessories. Also three centrifugal circulating water pumps, each capable of 23,000 g.p.m. Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. for each specification. (See June 14 issue.)

Aug. 24.—Fife. Electrical installation in each of following schools: Carleton primary, Glenrothes, Camdean primary, Rosyth, Valley primary, Kirkcaldy, Blacklaw primary, Dunfermline, Comrie junior secondary, Oakley. Surveyors, Messrs. James Gentles and Son, Central Chambers, High St., Kirkcaldy.

Aug. 31.—Belfast. Supply and erection of 33 kV and l.v. transformers of ratings up to 7,500 kVA. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne 1. Deposit £5 5s. (Advertised in this issue.)

Sept. 3.—Dublin. Electricity Supply Board invites tenders for supply, delivery and erection of one 30 MW steam-driven turbo-alternator set with condensing plant, feed heating plant and auxiliaries at Ringsend power station. Generation Engineer, 27 Lower Fitzwilliam St., Dublin. Deposit £5 5s. (See May 24 issue.)

No date stated.—Dudley T.C. Installation of electric lighting and power points in 811 houses on Priory estate, 257 on Wolverton Rd. site, 86 in Northfield Rd. and 34 on Woodside estate. Applications to Borough Architect, Priory Hall.

No date stated.—N. of Scotland H.E. Board. Supply and erection of approx. 25 miles of 11 kV and 26 miles of low voltage wood pole overhead lines, and about 1½ miles of cabling at Banchory Devenick and Old Machar, Aberdeenshire. Merz and McLellan, 39 Northumberland St., Edinburgh. Deposit £1 1s. (See July 12 issue.)

No date stated.—Carnoustie T.C. Conversion from gas to electricity of some 50 houses. D. M. Paton, burgh surveyor. Deposit £1 1s.

OVERSEAS

*Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.*

Aug. 7.—New Zealand. Supply of lifting gear components to form part of electrically-operated lifting gear units at Tekapo Lake Control Works. Equipment comprises six worm gear reducers, six electric motors, 1.5 h.p., fire starters and solenoid operated breaks, and six limit switches. B.o.T. (Ref: CRE(IB)65427/51).*

Aug. 13.—Uruguay. Supply of 1,000 bakelite plates for terminals of telephone cables of 10 couples lead covered for Usinas Electricas y Telefonos del Estado.

Aug. 15.—Uruguay. Usinas Electricas y Telefonos del Estado requires supply of 15,000 subscribers' telephones and spares for service in automatic network of city and dept. of Montevideo.

Aug. 17.—New Zealand. Post and Telegraph Dept. requires three portable frequency meters. Stores Division, G.P.O., Wellington C.1. B.o.T. (Ref. CRE (IB)65712/51)*.

Aug. 18.—India. The Singareni Collieries Co. Ltd., require switchgear with industrial type circuit-breakers and necessary current and potential transformers,—circuit 3300 V 3-phase 50 cycles. Company's address is Singareni P.O., Bhadrachellam Rd., N.S. Railway, Deccan. B.o.T. (Ref. CRE(IB)65070/51)*

Aug. 21.—Uruguay. Tenders sought for total of 8,300 metres single phase conductors, 81,000 metres two-phase conductors, and 19,500 metres three-phase conductors, lead covered cables to cover 250 V. Usinas Electricas y los Telefonos del Estado, Julio Herrera y Obes 1471, Montevideo.

Sept. 18.—New Zealand. State Hydro-Electric Dept. invite tenders for one 10,000 kVA 66/11 kV T.C.O.L. transformer bank for Southbrook substation. Tenders to Secretary, Wellington. B.o.T. (Ref. CRE(IB)65711/51)*.

CONTRACTS PLACED

B.E.A. Bulk orders for 275/132 kV 120 MVA auto transformers as follows: British Electric Transformer Co. Ltd., 4 at Elstree; British Thomson-Houston Co. Ltd., 3 at Staythorpe and West Melton; English Electric Co. Ltd., 2 at Drakelow; Ferranti Ltd., 2 at Ferrybridge; Metropolitan Vickers Electrical Co. Ltd., 4 at Carrington; and C. A. Parsons & Co. Ltd., 2 at Blaydon-on-Tyne.

Carlisle. Complete electrical installation in 152 houses, N.W. Electricity Board.

Your Queries — Answered

"Duroid" plugs, makers of? T.E.—Falk Stadelmann & Co. Ltd., 91 Farringdon Rd., E.C.1. (20756)

"Nibblex" cutters, suppliers of? C.C.—Douglas Oliver & Co. (London) Ltd., 92 Bishopsgate, E.C.2. (20772)

"K.E.S." foot switches, makers of? W.W.—These were taken over by Restlight Ltd., 16 Doughty St., W.C.1. (20783)

"Light Trade" sewing machine motor, makers of? E.S. — Sew-tric Ltd., Spring House, Spring Place, N.W.5. (20795)

"Commerlite" lighting fittings, makers of? B.C.—Simplex Electric Co. Ltd., Broadwell Rd., Oldbury, Birmingham. (20806)

"Gem" water heaters, makers of? A.P.—Gem Water Heater and General Component Co. Ltd., 36 Station Rd., Westcliffe-on-Sea. (20821)

"Freezemaster" farm freezers, suppliers of? E.E. —Frigicold Ltd., 10 Manchester Sq., W.1. (20888)

The above are selected from questions we have answered this week. If you have a query, send it to us.

Dudley T. C. Installation of electricity in further 229 houses. Goldsmith and Cantrill, £5,271.
Middlesbrough T.C. Street lighting scheme in first development at Berwick Hills, N.E. Electricity Board, £1,146.
Newcastle (Staffs) T.C. Street lighting of trunk road and Bradwell Lane, British Thomson-Houston Co. Ltd., £10,310.
Sheffield. Electric lighting for phase 2 of Totley Hall training college of housecraft, Yorkshire Electricity Board, £5,910.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	234 0 0	£220 0 0
LEAD, good soft pig (foreign)	180 0 0	136 0 0
" " " "English" quality ...	181 10 0	
TIN (99-99.75%) ... ...(Cash)	847½ - 850	—
" (3 months)	819 - 820	—
ALUMINIUM, commercial purity (del.)	124 0 0	—
ZINC	190 0 0	140 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	50 0 0	—
Mild Steel Tape (0·04 in.)	26 10 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Eagle Refrigeration Co. Ltd. Petition for winding-up presented on July 5 and directed to be heard at Royal Courts of Justice, Strand, London, W.C.2 on July 23. Interested parties should contact Samuel Tonkin and Co., 3 Berners St., W.1. Meeting of creditors to be held at Berners Hotel, Berners St., on July 30 at 3 p.m.

Auto-Cold Refrigeration Ltd., 34 Fontaine Rd., S.W.16. Clifford Henry Barclay, 5 Giltspur St., E.C.1, has been appointed liquidator with a committee of inspection.

Manton's Electrics Ltd. Resolution passed at meeting on June 14 for voluntary winding-up. Jack Berliand, Burwood Oak, Burwood Park, Walton-on Thames, was appointed liquidator. Meeting of members will be held at 1 Copse Rd., Cobham, Surrey, on Aug. 10 at 10 a.m. to receive liquidator's account.
Refrigeration Patents Ltd. Resolution for voluntary winding-up passed at meeting on June with appointment of Benjamin Neasham, I.C.I. Ltd., Billingham, Durham, as liquidator.

Public Utilities (Electric) Ltd. Meeting of members to be held on Aug. 31 at Midland Bank Chambers, Westgate, Grantham, at 3 p.m., to receive liquidator's report.

First Meeting

Derby. Leslie Reginald Maisey, electrical contractor trading as "R. Maisey" at 50 High St. Alfreton, Derbyshire, and at 3 Main Rd., Jacksdale, Notts. Meeting at Official Receiver's Office, 22 Regent St., Park Row, Nottingham, on July 20 at 3 p.m., and public examination at The Court House, 20 St. Peter's Church Yard, Derby, on Sept. 11 at 10 a.m.

London. Brooks Bros. and Faithfull Ltd., of Putney, S.W.15, manufacturers of electrical accessories. Meetings of creditors and contributories at Inveresk House, Strand, W.C.2, today, Thursday, at 11.30 a.m. and 12 noon respectively.

Partnership Dissolved

Crieff. W. J. Thomson and L. L. Thomson, trading as Frank Thomson, electrical and radio engineers. Partnership dissolved as from March 31. Business will be carried on by L. L. Thomson.

Voluntary Liquidation

British Electric Co. (Beco) Ltd., 25 Lower Rd., S.E.16. At meeting of creditors approximate statement of affairs showed liabilities of £24,928. Assets estimated to produce £10,488 and after allowing £1,007 for preferential and secured claims, there were net assets of £9,481, or a deficiency as regarded creditors of £15,447. So far as the shareholders were concerned, there was total deficiency of £20,447. Resolution passed confirming the voluntary liquidation. Mr. A. W. Hunter, of Messrs. Latham and Co., 185-188 High Holborn, London W.C.1, was appointed liquidator, with a committee of inspection.

BANKRUPTCY ACTS

Release of Trustee

Kidderminster. George Maddison electrician trading at Church St., Kidderminster. Trustee was Rudolf K. Clark, Official Receiver, Somerset House, 37 Temple St., Birmingham 2.

London. Richard F. Herbert, Reginald T. Herbert and Albert J. Rogers trading as "Aligned Instrument Services" at 1 Colworth Rd., Leytonstone. Trustee was F. H. Langmaid, Official Receiver, Bankruptcy Buildings, Carey St., W.C.2.

Intended Dividends

Ipswich. Jack Cooper, mechanical and electrical engineer, trading at Market Place, Orford. Last day for receiving proofs, July 31. Trustee is Kenneth E. Fisk, 13A Gt. Colman St., Ipswich.

Receiving Order

Newcastle-on-Tyne. Noel Doidge and John Stephenson, electrical contractors, trading as "Doidge and Stephenson" at 16 Coldwell St., Felling. Date of receiving order, July 5.

First Meeting

Brentford. Basil Frank Robbings, electrical engineer and contractor trading as "Electric House" at 1388 Greenford Rd. Meeting at 3 Central Bldgs., Matthew Parker St., S.W.1, on July 18 at 11 a.m., and public examination at Court House, Half Acre, on Sept. 14 at 11 a.m.

Orders on Application for Discharge

Birmingham. Frank Robinson, refrigerating and electrical contractor, trading at 100 Henshaw Rd., Small Heath. Date of order, June 6. Bankrupt's discharge suspended for three months and that he be discharged on Sept. 6. Grounds named: for refusing an absolute Order of Discharge.

TRADE NOTES

New Phone No. The telephone number of Cable Jointers Ltd., 49 Avenue Rd., Acton, W.3 has been changed to ACOrn 6581.

Tungsten. The Ministry of Materials will become the sole importer and distributor of tungsten ores and concentrates as from July 30. Shipments licensed for import and already sold to consumers will not be affected by these new arrangements.

BUSINESS PROSPECTS

HOME

Alnwick (Northumberland). Architect for bus station in Clayport St. is A. A. Briggs, 10 Fleet St., London E.C.4.

Bermondsey. It is planned to build further block of 18 flats on Purbrook estate and block of 19 flats on Lynton estate. Quantity surveyors being appointed.

Berwick. Various trades in erection of 24 houses at Gordon, Leitholm and Reston. J. and J. Hall, Ladhopevale, Galashiels.

Bexley T.C. Erection of a total of 143 dwellings on Hurst Place estate. Borough Engineer and Surveyor, West Lodge, Broadway, Bexleyheath.

Billingham U.D.C. Construction of 96 houses on Roseberry Rd. site. Council's Architects, Kitching and Co., 21 Albert Rd., Middlesbrough.

Birmingham. City Council has disclosed that it is proposed to let contracts for construction of about 4,260 dwellings during 1952.

Blaydon-on-Tyne U.D.C. Plans in hand for further 70 houses on Parkhead estate.

Bradford. All trades for erection of two new wings and boiler house at Technical College. City Architect, Town Hall.

Brigg U.D.C. Electricity is to be installed in 151 houses at an estimated cost of £3,397.

Bristol. It is proposed to adapt Muller's Orphanage to provide student accommodation at estimated cost of £443,000. Also the erection of 24 flats is planned for Henbury estate.

Bury St. Edmunds T.C. Tenders will probably be sought shortly for construction of 56 houses. Plans approved for 16 maisonettes of Derwent Road.

Caernarvonshire. Tenders invited for erection of primary school at Llanllechid. County Architect, County Offices, Caernarvon.

Cheltenham. Council recommended to approve factory extensions for Golden Crunch Ltd., extensions to N. Gloucestershire technical college, and building of factory for G. Monroe Ltd. Also plans submitted for building of 30 houses.

Coventry. Revised scheme approved for an art gallery and museum at Jordan Well and Lane.

Dudley T.C. Consideration being given to appointment of O. A. Wainwright, Temple Row, Birmingham, as quantity surveyor for erection of primary school in Buffery Road.

Dudley T.C. Conversion to electricity of 1,188 houses at present lighted by gas. Tenders expected to be invited shortly.

Ebbw Vale U.D.C. Erection of 30 houses on Tredegar Rd. site. Architect to Council, District Council Offices, The Walk.

Ely (Cambs) R.D.C. Construction of 30 dwellings at Stretham. Engineer and Surveyor, 11 Lynn Rd., Ely.

Glendale R.D.C. Ministry has approved scheme for 64 houses at Wooler.

Gosforth (Northum.) U.D.C. Application has been made for sanction to borrow £106,924 for erection of 82 houses on Church Ave. estate. Council's Surveyor is Clifford Wyld.

Great Harwood U.D.C. Erection of 32 houses in the borough. Applications to A. Sefton Bingham, Clerk of the Council, Town Hall.

Havant (Hants) U.D.C. Plans approved for erection of 180 houses at Bedhampton.

Ilford T.C. Approval sought for erection of 72 flats in six 3-storey blocks in Billet Road.

Leicestershire. It is proposed to build an infants' school at Thurmaston at estimated cost of £31,000.

Litherland U.D.C. Fifteen shops and 30 flats being built in Kirkstone Rd. North. Quiggin and Gee, 11 Old Hall St., Liverpool 3.

Magor and St. Mellons R.D.C. Tenders are being invited at present for site preparations for 36 flats at Bassaleg. Engineer and Surveyor, Council Offices, Baneswell, Newport.

Margate T.C. Building of 92 houses (under five contracts) on Cambourne Av. estate. W. L. Armstrong, Borough Engineer, 38 Grosvenor Place.

Monmouthshire. Erection of junior school at High Cross, Rogerstone. Colin L. Jones, County Architect, Queen's Hill, Newport.

North Riding. The E.C. has approved a £42,640 estimate for primary school at Eastfield, Scarborough.

Radnorshire. Plans approved for erection of secondary school at Llandrindod Wells.

Rugby T.C. Erection of two three-storey blocks of flats (24) and 10 bungalows on Overslade estate. Borough Surveyor, Burford House, Church Walk.

Salford. Construction of a block of 57 flats in Lord St. City Engineer's Office, Town Hall.

Stockton-on-Tees T.C. Proposed building of an infants' school at Roseworth. Names should be submitted to Borough Architect, 28 The Square, Thistle Green, Stockton.

Spennymoor U.D.C. 50 houses are to be built at Kirk Merrington, together with shops and flats on various other estates.

Stretford. Erection of 34 houses and ten blocks of flats comprising some 32 dwellings on Christie Rd. site. A. H. Perry, Borough Surveyor, Town Hall.

Wallsend T.C. Plans have been approved for installation of electricity in 374 houses at an estimated cost of £2,895.

Waltham Holy Cross U.D.C. Erection of 44 houses on Paternoster Hill estate. H. J. Chapman, Clerk of Council, Town Hall.

Wanstead and Woodford T.C. Tenders expected to be invited shortly for installation of electricity in gas-lighted council houses. Also approval received for erection of 42 flats at South Woodford.

OVERSEAS

India. J. C. Condro and Sons, 22 Raja Woodmunt St. Calcutta, are anxious to represent U.K. manufacturers of light and medium industrial switchgear. Enquirers should mark their correspondence for the attention of Mr. S. K. Basu.

Nigeria. The U.K. Trade Commissioner at Lagos, has reported that plans are in hand for the development of broadcasting in Nigeria which indicates a prospect of greatly improved sales of wireless receiving sets in near future.

Switzerland. It has been announced in the Swiss Parliament that television would be introduced in the country. The experimental service to be centred on Zurich is to begin next spring.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

V. L. Dewitt Ltd., 3 Oxford St., W.1. Manufacturers of and dealers in electrical, radio and television apparatus, etc. Cap.: £1,000. Directors: V. L. Dewitt and Mrs. M. Dewitt.

Electrical Wholesalers (Shropshire) Ltd., Bridge Rd., Wellington, Salop. Cap.: £10,000. Dirs.: W. A. Balderstone and E. W. Jones, jun.

Murts Ltd., 18 Killigrew St., Falmouth, Cornwall. To take over business of a radio, electrical and refrigerator dealer and contractor, etc., carried on as "W. Murt" at Falmouth. Cap.: £12,000. Dirs.: W. F. Roach Murt and Mrs. L. J. Murt.

T. N. Park Ltd., 2 Akeman St., Tring, Herts. Electrical engineers and contractors, wireless and television engineers, etc. Cap.: £2,000. Dirs.: to be appointed by subscribers. Subs.: T. N. Park and Mrs. P. M. Park, 106 Northcroft Rd., W. Ealing, W.13.

Smiths Insulations Ltd. Cold storage and insulating engineers, and pipe coverers, etc. Cap.: £30,000. Permanent dirs.: B. T. Smith and Mrs. G. Smith, 10 Belvedere Rd., Burton-on-Trent, V. J. E. Smith and D. M. T. Smith.

SouthbourneRefrigerationLtd., Office Chambers, Lansdowne House, Bournemouth. Manufacturers of and dealers in refrigerators, etc. Cap.: £2,000. Dirs.: H. Creasey and Winifred M. Creasey.

Telesound Services Ltd., 38 Court Parade, North Wembley, Middx. Radio and television engrs., etc. Cap.: £100. Dirs.: D. Cross, R. R. Ramsay, A. G. E. Mousley and D. J. Comber.

T.G.I. (Southern) Ltd., 4a High St., Fareham. Dealers in and buyers of commercial and industrial structures, machinery, electrical goods, etc. Cap.: £250. Dirs.: W. J. C. Trythall and A. H. Kerr.

Thermal Devices Ltd., Farm Lane, S.W.6. To enter into agreements between John B. Pierce Foundation and Walter Instruments Ltd., manufacturers and developers of and dealers in patents, etc. Cap.: £4,000. Dirs.: To be appointed equally by the John B. Pierce Foundation and Walter Instruments Ltd.

J. H. Tyler and Son, Ltd., 31 Upper Tything, Worcester. Mnfrs. of and dlrs. in wireless, television and electrical goods, etc. Cap.: £3,000. Perm. dirs.: J. H. Tyler, Mabel A. Tyler, and G. J. Tyler.

Vicom and Co., Ltd., 7 Cork St., W.1. Manufacturers, fitters and sellers of and dealers in electrical, electronic and telephonic equipment, precision, mechanical and electrical engravers, etc. Cap.: £3,000. Dirs.: E. C. Woodall, J. D. Christopher and J. F. Colliver.

Wall Bros. (Radio-Electric) Ltd., 47 High St., Ramsey, Hunts. Cap.: £2,000. Dirs.: H. V. Wall and S. F. Wall.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Glomaster. 698,599. Class 11. Electric torches, lamps for motor vehicles, etc. Notek Electric Co. Ltd., 23 London Rd., Bromley, Kent.

Herald Record. With design 693,574. Class 9. Records for talking machines. Recorded Productions (London) Ltd., 92 Regent St., W.1.

Tuscan. B682,668. Class 7. Electric motors. Tuscan Eng. Co. Ltd., North Rd., Trading Estate, Bridgend, Glamorgan.

Sylvania. With design. 697,055. Class 9. Electrical apparatus and instruments, wireless sets, etc. Sylvania Electric Products Inc., 60 Boston, St., Salem, Massachusetts.

MEETINGS TO NOTE

MONDAY, JULY 23

INST. OF PHYSICS; (Industrial Radiology group).—Summer meeting and exhibition at Institute House, 47 Belgrave Sq., S.W.1. Continues until July 25.

TUESDAY, JULY 24

INSTN. OF ELECTRONICS (N.W. Branch).—Sixth annual exhibition at College of Technology, Manchester. Open until July 26.

RADIO CONVENTION.—Organised by British Instn. of Radio Engrs. Second part at University College, Southampton, until July 27.

TUESDAY, JULY 31

FESTIVAL SHIP "CAMPANIA" Exhibition opens at Cardiff on this date, remaining until August 11.

TELEPHONE MANUFACTURING CO.

THE 21st annual general meeting of Telephone Manufacturing Co., Ltd., was held on July 9 in London. Mr. Fred T. Jackson, O.B.E., comp.I.E.E. (Chairman and Managing Director) presiding. The following is an extract from his circulated statement:

The net profit of the Parent Company amounted to £192,016; taxation at the new rates takes no less than £105,603. Your directors have declared a further interim dividend of 7½% which they recommend should be the final dividend for the year 1950. This has been done because we are advised that a payment after June 30 may attract profits tax at the increased rate of 50%. Your directors are conscious of the fact that the total dividend of £50,000 subject to income tax has increased by 11% only since 1939 whereas wages and salaries are more than 100% higher. This is particularly hard on the 3,000 odd shareholders. Small savings directly or indirectly form a large part of risk capital, which is the lifeblood of industry, and an adequate return is essential if the supply of capital is to be maintained. Heavy taxation and mounting inflation are restricting severely the savings both of industry and of the individual. In the case of your company it is becoming increasingly difficult to retain a sufficient proportion of the profits with which to maintain and provide for a reasonable expansion of the business. The Parent Company's turnover for 1950 showed a small increase. 41·4% of the output was exported.

The British Post Office is the company's principal customer in the home market. There is no indication as to when it will be possible to recommence the development of the telephone service in this country.

The report was adopted.

Another important industrial installation

In one of Europe's most up-to-date plant for the production of Portland Cement and cement products, now in course of erection at Shoreham-by-Sea, Sussex, large quantities of HENLEY CABLES are being used for power and lighting circuits, on which satisfactory operation depends. Typical cable runs are shown in the illustrations which are reproduced by courtesy of the Associated Portland Cement Manufacturers.

HENLEY CABLES

BY APPOINTMENT ELECTRIC CABLE MANUFACTURERS

W.T.HENLEY'S TELEGRAPH WORKS CO. LTD.
51-53 HATTON GARDEN, LONDON, E.C.1

WESTON
Electrical Measuring Instruments

No. 1 Laboratory Instruments

The experience gained from over 60 years in the design and manufacture of precision instruments is embodied in Weston Laboratory Standards. Endless care in the selection and ageing of materials and in the assembly and calibration of the instruments ensures the maintenance of the extremely high accuracy of 0·1%. Features include 12" Vernier Scale, magnetic shielding and self-contained thermometer. Full details of these instruments and of the full Weston range of switchboard, panel, first grade and sub-standard instruments are available on request.

SANGAMO WESTON LIMITED

Enfield, Middlesex — *Grams: Sanwest, Enfield*

Tel: Enfield 3434 (6 lines) and 1242 (4 lines)

Branches: Glasgow, Manchester, Newcastle-on-Tyne, Leeds, Liverpool, Wolverhampton, Nottingham, Bristol, Southampton & Brighton

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. 0d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

CITY OF BELFAST

TRANSFORMERS—VICTORIA POWER STATION

TENDERS are invited for the supply, delivery and erection of 33 kV and lower voltage transformers of ratings up to 7,500 kVA.

Forms of tender (No. N.1034), conditions and specification, in quadruplicate, may be obtained from Messrs. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne 1, on payment of a deposit of five guineas, which will be refunded provided a bona-fide tender be lodged and not withdrawn. Cheques should be made payable to the Belfast Corporation Electricity Department. Extra copies of the contract documents may be obtained at three guineas per set; this sum is not returnable.

Each tender, in quadruplicate, in sealed envelope marked "Tender for 33 kV and Lower Voltage Transformers, Electricity Committee," and endorsed with the name and address of the tenderer, must reach the undersigned not later than 4 p.m. on Friday, August 31, 1951.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

The lowest or any tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
July, 1951. (L 413)

COUNTY BOROUGH OF SWANSEA

148 Houses at West Cross

TENDERS FOR ELECTRICAL INSTALLATION

ELECTRICAL engineers wishing to tender for the electrical installation for 148 houses at West Cross, Swansea, are invited to submit their applications to the Borough Architect, The Guildhall, Swansea, on or before August 4, 1951.

Plans, specifications and conditions of contract will be forwarded on application and deposit of two pounds, provided applicant gives satisfactory evidence of having previously carried out work of a similar character.

The deposit will be refunded after delivery of a bona-fide tender (which is not subsequently withdrawn) and the return of all documents.

No guarantee is given that the lowest or any other tender will be accepted.

T. B. BOWEN,
Town Clerk.

The Guildhall, Swansea.
July 15, 1951. (L 412)

CITY OF MANCHESTER

THE Education Committee invite tenders for the electrical installation at Poundswick County Primary School, Wythenshawe, Manchester.

Specification and drawings may be obtained at the office of the City Architect, Town Hall, upon payment of £1 1s. 0d., which sum will be returned upon receipt of bona-fide tenders. All cheques and postal orders are to be made payable to the order of "The Corporation of Manchester" and crossed.

Sealed tenders, enclosed in the official envelope, to be delivered at the Education Offices, Deansgate, Manchester, not later than 10 a.m. on Wednesday, August 8, 1951.

The Corporation do not bind themselves to accept the lowest or any tender.

PHILIP B. DINGLE,
Town Clerk.

Town Hall, Manchester.
July, 1951. (L 414)

BOROUGH OF SCUNTHORPE

STREET LIGHTING TENDERS

Ashby High Street, Scunthorpe

TENDERS are invited for the lighting to Group A standard of approximately 1955 yards of the above road.

The works include:

(a) The supply and erection of 21 reinforced concrete street lighting columns.

(b) The supply, erection and wiring of 42 by 400-watt mercury discharge lanterns.

Specifications and forms of tender may be obtained from, and the drawings inspected at, the office of Mr. Cyril Cooper, A.M.I.C.E., Borough Engineer and Surveyor, Comforts Avenue, Scunthorpe, Lincs.

Tenders, in plain sealed envelopes endorsed "Ashby High Street Lighting Scheme," must be received by the undersigned not later than 10 a.m. on Tuesday, July 31, 1951.

The Council do not bind themselves to accept the lowest or any tender.

W. P. ERRINGTON,
Town Clerk.

Municipal Offices,
34 High Street,
Scunthorpe, Lincs.
July 2, 1951. (L 348)

APPOINTMENTS VACANT

BRITISH ELECTRICITY AUTHORITY

London Division

STATION SUPERINTENDENT—NEW BANKSIDE GENERATING STATION

APPLICATIONS are invited for this position at the new Bankside Generating Station, Bankside, Southwark, London S.E.1, which will have an ultimate capacity of 240 MWS with oil-fired boilers.

STATION SUPERINTENDENT—BRUNSWICK WHARF GENERATING STATION.

Applications are invited for this position at Brunswick Wharf Generating Station, East India Export Dock, London E.14, which will have an ultimate capacity of 330 MWS with pulverised-fuel fired boilers.

Applicants must possess good administrative, organising and managerial abilities and experience of labour relations. A thorough practical and technical training with power station operation and maintenance experience is essential.

Salary and conditions of service for both these positions will be in accordance with the N.J.B. Schedule, Class "G," Grade 1 (based on first section), plus London allowance, £1,119 per annum.

SECOND ASSISTANT ENGINEER—CHIEF GENERATION ENGINEER'S (CONSTRUCTION) DEPARTMENT, DIVISIONAL H.Q.

Applications are invited for this position, the duties of which entail design, layout and installation of electrical plant in generation station. Wide experience in this class of work is essential.

Salary in accordance with N.J.B. Schedule C, Class "AX/EX," Grade 2, plus London allowance, £789 12s. to £1,044 15s. per annum.

These appointments are superannuable.

Applications, stating age, qualifications and experience, should be addressed to the Divisional Secretary, British Electricity Authority, London Division, Ergon House, Horseferry Road, Westminster, London S.W.1, to be received within 14 days of the publication of this advertisement.

J. N. WAITE,
Divisional Controller.
(L 405)

MIDLANDS ELECTRICITY BOARD

THIRD ASSISTANT ENGINEER
(OPERATIONS)

APPLICATIONS are invited for the above appointment on the chief engineer's staff at the headquarters of the Midlands Electricity Board, Mucklow Hill, Halesowen, nr. Birmingham.

The duties of the post are primarily concerned with the compiling of records covering: system loadings and operations, fault interruption reports and analysis, communications, including V.H.F. and other general records associated with system control, operations and communications.

Applicants should have a good electrical engineering experence in H.V. and L.V. distribution systems and preference will be given to those possessing the Higher National Certificate in electrical engineering or its equivalent.

The salary for the position will be in accordance with the N.J.B. Agreement, Grade 5, Schedule C, Class "AX-DX", £579-£776.

Applications, etc., stating full details of age, qualifications, experience, present post and salary, should be forwarded within 14 days to The Secretary (Ref. FWC), Midlands Electricity Board, Mucklow Hill, Halesowen, nr. Birmingham.

A. STEPHENS,
Secretary.

July 7, 1951. (L 402)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

APPLICATIONS are invited for the appointment of ASSISTANT MECHANICAL MAINTENANCE ENGINEER at Tir John Power Station, Swansea, at a salary in accordance with the Revised National Joint Board Agreement, Class "G," Grade 9 (£571 to £597 per annum).

Applicants should preferably have obtained the Higher National Certificate or its equivalent and served a regular apprenticeship.

Sound experience in the operation and maintenance of h.p. and l.p. boilers and turbines would be considered an advantage.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards' Scheme.

Forms of application may be obtained from the Divisional Secretary at the address below, to whom completed applications should be returned not later than July 31, 1951.

H. V. PUGH,
Divisional Controller.

Cardiff (Pengam Moors) Airport, Cardiff.
July 12, 1951. (L 418)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the position of SHIFT CONTROL ENGINEER at the Staythorpe Generating Station.

Applicants should have a sound training and practical experience in a modern generating station. The possession of a Higher National Certificate in Electrical Engineering, or its equivalent, would be advantageous.

The salary will be in accordance with Class "J" Grade 10 of the National Joint Board Schedule, and the post will be superannuable under the terms and conditions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity House, Barker Gate, Nottingham, and should be delivered to the undersigned not later than July 27, 1951.

L. F. JEFFREY,
Divisional Controller.

British Electricity Authority,
British Electricity House,
Barker Gate, Nottingham. (L 363)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the appointment of FIRST ASSISTANT DISTRICT ENGINEER (Senior Section Engineer) in the St. Helens District at a salary in accordance with Class "F/4," N.J.B. Schedule (£767/£785-£803 per annum).

Applicants must have had experience in the operation and maintenance of h.t. and l.t. mains and sub-stations, preferably up to 33 kV, in an industrial area.

The appointment will be superannuable and subject to medical examination.

Forms of application obtainable from the Manager, No. 2 Sub-Area, Merseyside and North Wales Electricity Board, Sandiway House, nr. Northwich, Cheshire, should be returned so as to be received not later than July 31, 1951.

JAMES RANKIN,
Secretary.
(L 427)

SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the position of GENERAL ASSISTANT ENGINEER (Sub-stations) in the West Central Sub-Area of the Board based on Fforestfach, Swansea.

Preference will be given to applicants who possess an Engineering Degree of a British University, the Higher National Certificate or its equivalent, or have passed the Graduateship Examination of the Institution of Electrical Engineers.

The salary for the position will be in accordance with Class "K," Grade 13 (£515 to £526 to £537) of the National Joint Board Schedule for the Electricity Supply Industry.

Applications, stating age, present position, present salary, qualifications and experience, and whether married or single, together with the names and addresses of three referees, should be addressed to the Secretary (Establishments), The South Wales Electricity Board, St. Mellons, Cardiff, so as to reach him not later than July 31, 1951.

D. G. DODDS,
Secretary.
(L 423)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the appointment of SECOND ASSISTANT TRANSMISSION ENGINEER (Construction) at Divisional Headquarters.

Candidates should have had experience in supervision of civil and electrical contracts for the construction and erection of sub-stations, overhead lines and underground cables up to and including 132 kV, and also the preparation of specifications for the above. Corporate membership of I.E.E. or equivalent qualification will be an advantage.

The salary will be in accordance with Class "AX/DX," Grade 2, of Schedule "C" of the N.J.B. Agreement (£752 to £966 per annum), and the post will be superannuable under the terms and conditions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity House, Barker Gate, Nottingham, and should be delivered to the undersigned not later than August 8, 1951.

L. F. JEFFREY,
Divisional Controller.

British Electricity Authority,
British Electricity House,
Barker Gate, Nottingham. (L 426)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the position of ASSISTANT ENGINEER (EFFICIENCY AND TESTING) at Freemen's Meadow Generating Station, Leicester.

Candidates should possess a Higher National Certificate in engineering, or equivalent qualification, and have had experience in the operation and control of modern power generating stations.

The salary will be in accordance with the N.J.B. Agreement, Class "H," Grade 11, at present £538-£558. The post will be superannuable within the provisions of the British Electricity Authority and Area Boards superannuation scheme.

Applications should be submitted on the official form, which may be obtained from the Divisional Establishments Officer, Barker Gate, Nottingham, and be returned not later than July 27, 1951.

L. F. JEFFREY,
Divisional Controller.

The British Electricity Authority,
British Electricity House,
Barker Gate, Nottingham. (L 382)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

SHIFT CHARGE ENGINEER, CHESTERFIELD

APPLICATIONS are invited for the position of Shift Charge Engineer at the Chesterfield Generating Station.

Applicants should have had a sound training and considerable practical experience in power-station operation. The possession of an Ordinary National Certificate in Mechanical or Electrical Engineering, or its equivalent, would be advantageous.

The salary is in accordance with Class "B," Grade 7, of the National Joint Board Schedule, and the position will be superannuable under the terms and conditions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications should be submitted on the official form, which may be obtained from the Divisional Establishments Officer, British Electricity House, Barker Gate, Nottingham, and should be delivered to the undersigned not later than August 8, 1951.

L. F. JEFFREY,
Divisional Controller.
(L 425)

BRITISH ELECTRICITY AUTHORITY

North Eastern Division

APPOINTMENT OF STATION CHEMIST
DUNSTON POWER STATION

APPLICATIONS are invited for the appointment of Station Chemist at Dunston Power Station.

Applicants should have had experience in modern power station laboratories covering the analysis of fuel water and oil and be conversant with water treatment and fuel sampling. A university degree in chemistry or A.R.I.C. is preferable, but candidates with a Higher National Certificate in Chemistry, followed by a recognised course of study will be considered.

The salary for this appointment will be in accordance with the National Joint Board Schedule "A", Grade 7, Class "K", £786-£822 per annum.

Superannuation will be in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Forms of application may be obtained from the Divisional Secretary (Establishments), British Electricity Authority, North Eastern Division, Carliol House, Newcastle-upon-Tyne, to whom they should be returned to arrive not later than August 10, 1951. (L 441)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the position of DEMONSTRATOR in the Brierley Hill District.

Applicants should have had a good general education and the possession of a recognised diploma in domestic science and electrical housecraft will be an advantage.

Duties will include the conducting of lecture demonstrations both in the service centres and on consumers premises and advice to consumers on the selection and use of electrical apparatus.

Salary and conditions of service will be in accordance with the N.J.C. Grade 1, within the range of £310-£350 per annum, with further progress to £390 per annum, subject to satisfactory service.

The successful applicant will be required to contribute to the Board's Superannuation Scheme, if eligible.

Training will be given where necessary to a suitable applicant.

Applications in writing, stating age, education, etc., should be forwarded within 14 days to Sub-Area Manager (Ref. CW), Midlands Electricity Board, Toll End Road, Tipton, Staffs.

July 6, 1951. (L 401)

ESSEX EDUCATION COMMITTEE

South East Essex Technical College and School of Art, Longbridge Road, Dagenham

Principal: F. HEATHCOAT, M.Sc., Ph.D., F.R.I.C., F.I.M.

APPLICATIONS are invited for the post of HEAD OF THE DEPARTMENT OF ENGINEERING, a Grade III Department under the Burnham Report.

Salary: £1,100 by £25 to £1,300 (man) plus £36 or £48 London Allowance.

Applicants for the post should possess a good engineering degree and should have had suitable industrial and administrative experience.

Further particulars and form of application may be obtained from the undersigned and should be returned within a fortnight of this advertisement.

B. E. LAWRENCE,
Chief Education Officer.

County Offices, Chelmsford. (L 420)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:

No. 6 (Hull) Sub-Area

SECOND ASSISTANT ENGINEER

(Meters, Testing and Protection) (Vacancy No. 61/51)

Applicants should have technical qualifications equivalent to Corporate Membership of the Institution of Electrical Engineers, and must have had experience of protective equipment on 66 kV, 33 kV, 11 kV and l.v. power systems. Experience of mains fault location will be an advantage.

The successful candidate will be expected to supervise installation work on the protective equipment on all the various power systems in the Sub-Area.

Salary—N.J.B. Agreement, Class "J," Grade 7, £736 to £770 per annum.

THIRD ASSISTANT DISTRICT ENGINEER
(Bridlington) (Vacancy No. 89/51)

Applicants should have had experience in planning, estimating and construction of overhead lines and substations, and in the operation of an extensive system in a rural area.

Preference will be given to candidates who are Corporate Members of the Institution of Electrical Engineers or who possess equivalent qualifications.

The successful candidate will be required to undertake standby duty and reside in Driffield.

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Salary—N.J.B. Agreement, Class "D," Grade 9, £494 to £510 per annum.

Applications, stating the above vacancy numbers, and giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 6 (Hull) Sub-Area, Yorkshire Electricity Board, Ferensway, Hull, within fourteen days of the appearance of this advertisement.

No. 7 (Grimsby) Sub-Area

THIRD ASSISTANT ENGINEER
(Distribution Design) (Vacancy No. 88a/51)

Salary—N.J.B. Agreement, Class "G," Grade 10, £539 to £561 per annum.

SECOND ASSISTANT ENGINEER
(Construction) (Vacancy No. 88b/51)

Salary—N.J.B. Agreement, Class "G," Grade 7, £651 to £679 per annum.

THIRD ASSISTANT ENGINEER (Construction)
(Vacancy No. 88c/51)

Salary—N.J.B. Agreement, Class "G," Grade 10, £539 to £561 per annum.

FIRST ASSISTANT DISTRICT ENGINEER
(Gainsborough) (Vacancy No. 88d/51)

Salary—N.J.B. Agreement, Class "D," Grade 5, £641 to £655 per annum.

Applicants should have had a sound practical training and experience in the operation, maintenance, planning and construction of high and low voltage underground and overhead networks, substation plant and ancillary apparatus.

Preference will be given to candidates who are Corporate Members of the Institution of Electrical Engineers, or who hold certificates in Electrical Engineering.

THIRD ASSISTANT DISTRICT ENGINEER (Grimsby)
(Vacancy No. 88e/51)

Salary—N.J.B. Agreement, Class "E," Grade 9, £519 to £531 per annum.

SECOND ASSISTANT DISTRICT ENGINEER
(Scunthorpe) (Vacancy No. 88f/51)

Salary—N.J.B. Agreement, Class "E," Grade 7, £579 to £609 per annum.

SECOND ASSISTANT DISTRICT ENGINEER
(Gainsborough) (Vacancy No. 88g/51)

Salary—N.J.B. Agreement, Class "D," Grade 7, £563 to £573 per annum.

Applicants should have had a sound practical training and experience in the operation, maintenance and construction of underground and overhead networks.

Preference will be given to candidates who hold certificates in Electrical Engineering.

Applications, stating the above vacancy numbers, and giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby, within fourteen days of the appearance of this advertisement. (L 424)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of JUNIOR ENGINEER in the Construction Department at Divisional Headquarters, Woolton, Liverpool. Commencing salary £375 per annum, rising to £505, Class "AX", Grade 9 of the N.J.B. Schedule.

Applicants should have a good general and technical education and possess a degree in engineering or equivalent qualifications. Practical experience in power station operation and maintenance or alternatively in plant manufacturers' works would be an advantage.

The appointment will be superannuable under the British Electricity Authority and Area Boards' Superannuation Scheme, and may be subject to a medical examination.

Forms of application may be obtained from the Divisional Secretary, Clarke Gardens, Woolton, Liverpool, and should be returned not later than Monday, July 30, 1951. (L 404)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the position of SHIFT CHARGE ENGINEER (£651-£679) at Portsmouth Generating Station.

Applicants should preferably be in possession of technical qualifications admitting to corporate membership of a recognised professional institution, have had previous experience in a large modern generating station, and also have had manufacturing works' experience.

Applications for forms should be addressed to the undersigned. Completed applications must be returned by August 3, 1951.

P. D. A. OLIVER,
Divisional Secretary.

British Electricity House,
111 High Street, Portsmouth. (L 417)

NORTH WESTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 1 Sub-Area

FIRST (SENIOR) ASSISTANT DISTRICT ENGINEER• EAST DISTRICT

The Engineer appointed will be responsible to the District Engineer for the successful carrying out on the District of the sub-station switchgear maintenance, laying and jointing of cables, switching operations on the h.v. and l.v. systems, network planning, records, transport, etc.

Applicants should have had a wide general experience on the distribution side of electricity supply. Corporate membership of the Institution of Electrical Engineers will be an advantage.

The salary will be in accordance with the National Joint Board Revised Agreement, Class "F," Grade 4, i.e. £767/£785/£803 per annum.

APPOINTMENT OF GENERAL ASSISTANT DISTRICT ENGINEER—SOUTH WEST DISTRICT

Initially the principal duties will be to assist on the development, construction and maintenance of the cable system, but all aspects of District work will be embraced later.

Applicants should have received technical training to Higher National Certificate level, and should have had practical experience in network development, cable installation and jointing.

The salary for the post will be in accordance with the National Joint Board Revised Schedule, Class "T," Grade 10, i.e. £488/£495/£502 per annum.

GENERAL ASSISTANT ENGINEER, SUB-STATIONS SECTION, MAINS ENGINEER'S DEPT.

The successful applicant will be required to assist with the installation and maintenance of the following:—Transformers up to 25 MVA; a wide range of types of switchgear for all voltages up to 33 kV; mercury arc rectifiers; rotary plant; ancillary equipment of all types.

Applicants should have had manufacturing experience, including "on-site" erection, and preference will be given to corporate members of the Institution of Electrical engineers.

The salary will be in accordance with the National Joint Board Revised Schedule, Class "M," Grade 13, i.e. £590/£600/£610 per annum.

DISTRICT COMMERCIAL ENGINEER—SOUTH WEST DISTRICT

The person appointed will be required to organise and control all commercial work and the necessary staff in the District, and will be under the guidance of the Sub-Area Consumers' Engineer for furthering the Board's development and sales policy.

The duties will include:—

1. (a) Supply of information and advice to all classes of consumers on electricity utilisation, tariffs, and on all matters concerning electricity service.
   (b) The completion, when required, of consequent negotiations, and co-ordination with other departments concerned.
2. Organisation and supervision of contract wiring work, and maintenance services on consumers' premises.
3. Control of showrooms, demonstrations, exhibitions and publicity.
4. Organisation and supervision of consumer records.

If an applicant has specialised knowledge in any particular aspect of development (domestic, commercial or industrial), details should be given.

The salary will be in accordance with the National Joint Board Revised Agreement, Class "E," Grade 3, i.e. £775/£792/£809 per annum.

Applications for the above posts, stating age, qualifications and experience, present post and salary, should be received by the Sub-Area Secretary, No. 1 Sub-Area, The North Western Electricity Board, Town Hall, Manchester 2, P.O. Box No. 493, not later than Saturday, July 28, 1951.

No. 2 Sub-Area

GENERAL ASSISTANT ENGINEER (TECHNICAL ASSISTANT) FOR SYSTEM PLANNING AND DEVELOPMENT

Candidates should have had a sound training in electrical engineering and be competent to assist in the preparation of schemes and estimates for extensions to the high and low voltage systems up to and including 33 kV, and in the design and layout of sub-stations.

Preference will be given to candidates with experience of protective gear systems and an aptitude for system calculations.

The salary will be in accordance with the National Joint Board Revised Schedule, Class "L," Grade 13, i.e. £547/£561/£575 per annum.

Applications, stating age, general education, qualifications and experience, present post and salary, should be received by E. G. Wardle, Esq., A.M.I.E.E., Sub-Area Manager, No. 2 Sub-Area, The North Western Electricity Board, National Buildings, St. Mary's Parsonage, Manchester 3, not later than Saturday, July 28, 1951.

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No. 3 Sub-Area

SECOND ASSISTANT ENGINEER (SYSTEM PLANNING AND DESIGN)

Candidates must have had a sound training in electrical engineering to degree or Higher National Certificate standard, and responsible experience in the following branches:—

(a) Preparation of specifications for switchgear and protective gear;
(b) Network calculations;
(c) Application of protective gear;
(d) Planning and construction of 33 kV and lower voltage systems;
(e) Substation design and construction.

The salary for the post will be in accordance with the National Joint Board Revised Agreement, Class "K," Grade 7, i.e. £786/£804/£822 per annum.

Applications, stating age, and giving full details with relevant dates of training and experience, qualifications, present post and salary, should be received by E. Binns, Esq., A.M.I.E.E., M.I.Mech.E., Sub-Area Manager, The North Western Electricity Board, No. 3 Sub-Area Headquarters, Union Street, Oldham, not later than Saturday, July 28, 1951.

No. 4 Sub-Area

GENERAL ASSISTANT DISTRICT ENGINEER (ASSISTANT INSTALLATION INSPECTION ENGINEER)—4A—PRESTON DISTRICT

The person appointed will be required to assist in the supervision of installation inspection, the fixing of meters and the maintenance of records in connection therewith.

Applicants should preferably have served an apprenticeship as an electrician and hold at least a National Certificate, or equivalent, in electrical engineering, have had experience in all classes of installation work and possess a knowledge of Statutory Regulations and the I.E.E. Wiring Regulations. Some experience of meter testing and the possession of a Higher National Certificate, or equivalent in electrical engineering will be an advantage.

The salary for the post will be in accordance with the National Joint Board Revised Schedule, Class "F," Grade 12, i.e. £443/£451/£459 per annum.

THIRD ASSISTANT ENGINEER (SENIOR ASSISTANT INSTALLATION ENGINEER—CONTRACTS)

The duties will include the preparation of estimates for contracting work, negotiation of contracts for industrial, commercial and domestic installations, and the supervision of the installation of wiring and equipment of all types, including motors and plants on consumers' premises, street lighting and standardisation of supply.

Corporate Membership of the Institution of Electrical Engineers is desirable.

The salary for the post will be in accordance with the National Joint Board Revised Schedule, Class "K," Grade 10, i.e. £646/£660/£674 per annum.

Applications for the above posts, stating age, experience, qualifications, present post and salary, should be received by the Sub-Area Manager, No. 4 Sub-Area, The North Western Electricity Board, 40/41 Lune Street, Preston, not later than Saturday, July 28, 1951.

No. 7 Sub-Area

DISTRICT COMMERCIAL ENGINEER, 7C—HIGH PEAK DISTRICT

Applications are invited for the appointment of District Commercial Engineer in the 7C—High Peak District, with District Headquarters at New Mills. The duties of the post consist of the supervision of all commercial activities in the district and include:—

1. (a) Supply of information and advice to all classes of consumers on electricity utilisation, tariffs, terms, apparatus, wiring schemes and specifications, and on all matters concerning electricity service.
   (b) Completion, when required, of consequent negotiations and co-ordination with other departments concerned.
2. Organisation and supervision of industrial and domestic installation work and consumers' maintenance service (including stand-by) and the routine testing and repair of domestic appliances, including the oversight of workshops and stores.
3. Control of service centres, demonstrations, exhibitions and publicity.

Corporate membership of the Institution of Electrical Engineers will be considered an advantage.

The salary for the post will be in accordance with the National Joint Board Schedule, Class "D," Grade 3, i.e. £732/£746/£760 per annum.

Applications, stating age, qualifications and experience, present post and salary, should be received by F. J. Cole, Esq., M.I.E.E., M.I.Mech.E., Sub-Area Manager, No. 7 Sub-Area, The North Western Electricity Board, Chapel Street, Hazel Grove, Cheshire, not later than Saturday, July 28, 1951. (L 406))

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

Chilterns Sub-Area

Aylesbury District (78/51 R)

DEMONSTRATOR OR HOUSECRAFT ADVISOR

Candidates should have had a domestic-science training, including electrical housecraft, and should preferably hold the E.A.W. Certificate. They should be competent to plan and give cookery demonstrations, including lectures and advice to consumers on the utilisation of domestic appliances. Previous experience in an Electricity Service Centre is desirable.

The salary for the appointment will be in accordance with Grade 1 (£310 p.a. by £20 to £390 p.a.) of the National Joint Council Salary Agreement.

A successful candidate, having adequate experience and the additional qualification of the E.A.W. Diploma, may, however, be appointed as Housecraft Advisor with a salary in accordance with Grade 2 (£390 p.a. by £20 to £450 p.a.) of the above-mentioned Agreement.

The successful candidate will be required to work Service Centre hours and live in the Aylesbury District.

Applications should be submitted to the District Manager, Aylesbury, Eastern Electricity Board, Exchange Street, Aylesbury, Bucks.

Northmet Sub-Area

Barnet District (81/51 R)

SECOND ASSISTANT ENGINEER

(Ref. No. 302)

Candidates should have had a sound technical training and experience in the construction, operation and maintenance of h.v. and l.v. overhead and underground systems.

The salary for the appointment will be in accordance with Class "E," Grade 7, of the National Joint Board Salary Agreement, commencing at £579 plus £29 p.a. London Allowance.

Applications should be submitted to the District Manager, Barnet, Eastern Electricity Board, 7c High Street, Barnet, Herts.

Suffolk Sub-Area

Haverhill-Bury St. Edmunds District (82/51 R)

ELECTRICITY SERVICE MANAGER

In addition to experience of organisation and management, candidates should have had extensive experience in all the commercial activities pertaining to a branch office, including contracting and the running of a Service Centre, and be thoroughly competent to advise consumers on the utilisation of electricity. They should also be competent to carry out certain engineering duties not exceeding the erection and maintenance of l.v. services (principally overhead) and, subject to instruction, switching operation of l.v. and h.v. distribution networks.

The annual provisional salary for this appointment will be £560.

Applications should be submitted to the District Manager, Bury St. Edmunds, Eastern Electricity Board, 4 Cornhill, Bury St. Edmunds, Suffolk.

Suffolk Sub-Area

Ipswich District (83/51 R)

GENERAL ASSISTANT ENGINEER

Candidates should have had a sound technical training and experience in the construction, operation and maintenance of h.v. and l.v. overhead and underground systems with sub-stations in both urban and rural areas.

The salary for the appointment will be in accordance with Class "F," Grade 11, of the National Joint Board Salary Agreement, commencing at £482 p.a.

Applications should be submitted to The District Manager, Ipswich, Eastern Electricity Board, Russell House, Russell Road, Ipswich, Suffolk.

Both future salaries and conditions of service for these appointments will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidates will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications, stating age, education, qualifications and experience, with details of present appointment and salary, should be submitted within 14 days of the appearance of this advertisement. (L 428)

SOUTH EASTERN ELECTRICITY BOARD

Brighton and Hove District

SENIOR SHOWROOM ASSISTANT (MALE)

SALARY £390 by £20 to £450 per annum under the N.J.C. Agreement, Grade 2. Superannuation will be arranged. Candidates should have a good knowledge of showroom and sales work and experience of a large electricity supply showroom in an urban area.

Applications, giving two referees, must reach the Brighton and Hove Manager, SEEboard, Electric House, Castle Square, Brighton 1, by July 30, 1951.

A. L. BURNELL,
Secretary.

July, 1951. (L 421)

CHINA LIGHT AND POWER CO., LTD.,

Kowloon, Hong Kong

ASSISTANT ENGINEER—
DISTRIBUTION DEPARTMENT

APPLICATIONS are invited for the above position from suitably qualified engineers, preferably aged 30 to 35 years.

Applicants must have sound theoretical training and practical experience in the installation and maintenance of high and low voltage underground and overhead mains, static sub-station plant and distribution equipment.

The Company operates only in the Crown Colony of Hongkong, using modern British equipment, and the position offered is progressive for a capable and experienced man.

Commencing salary HK$ 1,025 per month, rising by annual increments of HK$ 25 to HK$ 1,450, with high cost of living allowance which varies in accordance with the Local Government Index Figure, the present allowance being HK$ 881 for married men, HK$ 518 for single men; in addition there is an allowance of HK$ 100 for the first child and HK$ 90 for the second. The average value of the Hong Kong dollar is 1s. 2 13/16d.

A Provident Scheme is in operation and also a Retiring Fund, qualification for the latter being 20 years' service and age 55.

First class unfurnished quarters are provided or alternative accommodation, also free passage (P. and O. 2nd class) out and return passage after completion of contract. Successful applicants will be required to pass a medical examination.

Apply, giving full particulars and when available to: Box ET145, L.P.E., 110 St. Martin's Lane, W.C.2. (L 422)

MIDLANDS ELECTRICITY BOARD

North Staffs Sub-Area

APPOINTMENT OF THIRD ASSISTANT ENGINEER

APPLICATIONS are invited for the above appointment at the headquarters of the above Sub-Area, 31 Kingsway, Stoke-on-Trent.

Applicants must have had experience in the design and operation of underground and overhead networks and will be required to undertake duties in connection with technical records and calculations. Appropriate technical qualifications will be considered an advantage.

Conditions of service will be in accordance with the National Joint Board Agreement and the salary will be Class "J," Grade 10 (£609 to £633 per annum).

Applications in writing, stating age, qualifications, experience and present salary should be forwarded within seven days to Mr. H. A. F. Caddell, Manager, Midlands Electricity Board, 31 Kingsway, Stoke-on-Trent.

A. STEPHENS,
Secretary.
(L 419)

A SENIOR DRAUGHTSMAN required with experience precision mechanical or electro-mechanical apparatus. Also Senior Draughtsman with experience of radio and electronic instruments. Salary up to £11 per week. —Reply, giving fullest details, to Box No. 8051, Electrical Times. (L 398)

A SENIOR EXECUTIVE is required to act as technical engineer and to manage the works of a company manufacturing paper cables abroad. Applicants must have first-class qualifications and experience to meet the responsibilities of this progressive position. Advertiser is not a member of the C.M.A.—Box No. 8057, Electrical Times. (L 407)

APPLICATIONS are invited by Thorn Electrical Industries Ltd. for the appointment of EXPORT SALES MANAGER. The position is a responsible one requiring an extensive knowledge of overseas markets and wide experience in the electrical industry.—Write, in confidence, giving full details to the Managing Director, 105 Judd Street, W.C.1. (L 395)

APPLICATIONS are invited from qualified ELECTRICAL DRAUGHTSMEN with designing experience in electrical machine switchgear, transformer and cable layout work for heavy industry in New South Wales, Australia.—Apply with full particulars to W. Riley, c/o John Lysaght's Bristol Works Ltd., St. Vincent's Works, Silverthorne Lane, Bristol 2. (L 440)

ASSISTANT DESIGNER for induction motors and for direct current machines up to 200 h.p., is required by a Midlands firm. Please state age, experience, technical training and salary desired.—Box No. 8049, Electrical Times. (L 397)

DESIGN DRAUGHTSMAN required by old-established firm of automatic electric control gear manufacturers in Home Counties. Experience in design of automatic contactor gear essential. Modern factory, 5-day week, canteen, incentive bonus, superannuation scheme. —Write, stating age, experience and salary required, to Box No. 8013, Electrical Times. (L 303)

DESIGN DRAUGHTSMEN required for interesting engineering development work. Preference for applicants with H.N.C. or equivalent qualifications, and workshop training. Experience of electric furnace design, mechanical handling-gear, etc., an advantage. Salary above A.E.S.D. rate offered to man with initiative and ability to execute designs with minimum technical supervision. Housing scheme in operation.—Apply, Box No. 8069, Electrical Times. (L 438)

DESIGN ENGINEERS required for small group working on the design of special machine tools and handling equipment in connection with development of gas turbine components at Midland factory. Men with considerable mechanical design experience and good technical qualifications only need apply. Excellent opportunities and salary above A.E.S.D. rate to men with ability and initiative. Housing scheme in operation.—Apply Box No. 8071, Electrical Times. (L 439)

DESIGN ENGINEER required by successful old-established company in the North of England, engaged particularly in the manufacture of heavy duty d.c. switchgear. He should have scientific and commercial qualifications as well as practical experience, originality and initiative. He would have unlimited opportunity for developing his ability at a good salary, rising without limit according to his performance. To the right man the future prospects are bright.—Box No. 6079, Electrical Times. (K 805)

DIE DESIGN DRAUGHTSMEN required for modern drop forging plant. Preference will be given to applicants with experience of up-to-date forging methods, but those with jig and tool or general engineering experience will be carefully considered. Excellent prospects for men of initiative and ability. Salary above A.E.S.D. rate for the right men. Housing scheme in operation.—Apply, stating age, experience and salary required to Box No. 8065, Electrical Times. (L 436)

DRAUGHTSMAN required by manufacturers of industrial electric cooking and heating equipment. Midlands. Age, experience and salary required.—Box No. 8053, Electrical Times. (L 399)

DRAUGHTSMAN required with experience on design and development of metalclad switchgear up to 250mVA at 11kV. Also Contracts Draughtsman required, experienced on flat back and cubicle type switchgear, and able to do diagrams. Good salary offered for suitably qualified applicants. Pension scheme available.—Reply, stating age, salary and full details of technical qualifications, to Erskine, Heap and Co. Ltd., Lancashire Switchgear Works, Salford, Manchester 7. (L 351)

DRAUGHTSMEN having experience in the layout of unit type low tension panels and distribution equipment required.—Apply, in writing, stating age, experience and salary required, to the Personnel Officer, W. T. Henley's Telegraph Works Co., Ltd., Gravesend. (L 394)

DRAUGHTSMEN experienced shop layouts, air, water, gas services, etc. Buildings, heavy plant foundations, mechanical handling, etc., for expansion programme. Good positions for the right men. Salary above A.E.S.D. Housing scheme in operation.—Apply: stating age, experience, etc., to Box No. 8067, Electrical Times. (L 437)

DRAUGHTSMEN, senior and junior, for the design of switch and control boards, also draughtsmen or design engineers, capable of compiling comprehensive diagrams for power station equipment. Good remuneration for experienced reliable men.—Apply, quoting "Switchgear," to Staff Manager, General Electric Co. Ltd., Witton, Birmingham 6. (L 349)

ELECTRICAL AND MECHANICAL ENGINEERS AND PHYSICISTS are invited to apply for employment in the Illumination Group of the Research Laboratories of The General Electric Co., Ltd., East Lane, North Wembley, Middlesex. Candidates should be graduates or have equivalent qualifications and be interested in the practical work of a laboratory as well as more fundamental investigations. A commonsense approach to a wide range of electrical, mechanical, optical and thermal problems will be required but no experience of lighting is necessary. Previous training in a works may be an advantage.—Letters, giving details of age and record, should be sent to the Staff Manager (Ref. GBLC/513). (L 371)

ELECTRICAL DRAUGHTSMEN wanted for long-term oil refinery and chemical plant programme. Five-day week, pension and insurance plan.—Write, stating experience and salary required, to Chief Engineer, E. B. Badger and Sons (G.B.) Ltd., 40 Parkgate Road, Battersea, London S.W.11. (L 62)

ELECTRICAL ENGINEER required for electrical contractors on south coast, knowledge of shipwork advantageous.—Please write, giving details of age, qualifications and experience, to Box "C.O." c/o Geo. J. Smith and Co. Ltd., 74/76 Temple Chambers, Temple Avenue, London E.C.4. (L 344)

ELECTRICAL ENGINEER required for Middle East by large oil company. Honours degree and/or A.M.I.E.E. qualification with considerable practice layout construction, operation and maintenance of e.h.t. and l.t. switchgear, transmission and distribution overhead and underground systems and substation equipment, utilisation installations, industrial plant up to 500 h.p. motors and domestic installations. Diesel generating station experience an added advantage. Age 30-40.—Write quoting No. 100 to Box 5067 c/o Charles Barker and Sons Ltd., 31 Budge Row, London E.C.4. (L 409)

ELECTRICIAN, FOREMAN OR JUNIOR SUPERVISOR required for Melbourne, Australia, by an old-established and well-known London building and civil engineering contractors.

The applicant should preferably be of National Certificate standard with a thorough practical training. The immediate requirement is for a man to reliably carry out electrical installation of the company's new offices, bungalows, etc., in Melbourne, without electrical supervision, and subsequently to act as the company's electrician.

This is an unusual opportunity for the man with the right personality and energy to reach a high status with the company's development.

Applicants should, in the first instance, write, giving adequate particulars of age, training—both practical and technical, if married or single, and salary desired.

Passage to Australia and accommodation there will be provided and terms of remuneration will be based on the applicant's immediate competence for the job and potential development.

It is not possible at this stage to provide for family accommodation, but provisions for this are being developed as quickly as possible.—Reply Box No. 8035, Electrical Times. (L 366)

ESTABLISHED non-association cable manufacturer requires ENGINEER, competent to design super tension cable and supervise processing and testing. This senior position is permanent and pensionable and affords scope for development. Previous experience is essential. Applications should give full details of training and experience.—Box No. 8031, Electrical Times. (L 357)

EXPERIENCED ENGINEERS accustomed to the erection of lattice tower, concrete and wood pole overhead transmission lines and willing to serve either at home or overseas, age 25-45. Good prospects and pension.—Apply, in writing, giving full details, to Staff Officer, British Insulated Callender's Construction Co., Ltd., 21 Bloomsbury Street, London W.C.1. (L 393)

FALCO ELECTRICAL APPLIANCES LTD. require the services of full time DEMONSTRATOR. Replies should give age, experience and salary required.—Corporation Road, Audenshaw, Manchester. (L 359)

IMPERIAL CHEMICAL INDUSTRIES LTD., Plastic Division, requires a WORKS ELECTRICAL ENGINEER for appointment to their Hillhouse factory, near Blackpool, Lancs. Candidates should possess a degree in engineering, or hold associate membership of the I.E.E. They should also have had several years' experience of electrical work in a process industry. Age limit 45. Salary according to age and qualifications.—Write for applications form to the Staff Manager, I.C.I. Ltd., Plastics Division, Black Fan Road, Welwyn Garden City, Hertfordshire. (L 408)

JOHNSON AND PHILLIPS LTD. have a vacancy for a TRANSFORMER DESIGNER experienced in dealing with all sizes up to 10 M.V.A. This is an attractive opening for a progressive man. Five-day week, staff pension and bonus scheme, good welfare facilities, sports club with private sports ground catering for cricket, tennis, Association and Rugby football. Work's canteen with licensed bar and equipped for billiards, table tennis, amateur dramatics, etc.—Applicants should state age, experience, training and salary required and be addressed to Employment and Welfare Manager, Johnson and Phillips Ltd., Victoria Works, Charlton, London S.E.7. (L 289)

LANCE OF LLANDUDNO, LTD., Electrical Engineers, require WORKING MANAGER for branch in country district.—Apply: 23 Mostyn Street, Llandudno. (L 434)

MALE CLERK required for works office of manufacturers of electrical appliances, Greenford area. Previous experience of preparing works orders and material schedules essential. Knowledge of internal progress chasing an advantage.—Apply by letter, stating age, experience and salary, to Box No. 52901, A.K. Advg., 212a Shaftesbury Avenue, W.C.2. (L 431)

OPENINGS for two ELECTRICAL DRAUGHTSMEN between 45 and 50 years of age. West Midlands. Preferably experienced l.t. control gear, plant layouts and diagrams. Good pension scheme, canteen facilities, 5-day week with some overtime. State age (not exceeding 50), present salary and give references.—Box No. 8029, Electrical Times. (L 356)

PERSONNEL, experienced in the maintenance and repair of electronic control equipment and radar equipment as applied to anti-aircraft guns, are required for employment as civilians in the following areas: Guildford, Portsmouth, Southampton, Bristol, Gloucester, Andover, Central Dorset and Bournemouth. The standard required is that of Armament Artificer R.E.M.E. Salary £380 by £20 to £495, linked to the age of 26. One increment deducted for each year below 26 years and up to two increments added over 26 years. Opportunities exist for promotion to higher grades. Replies, giving full details of age, experience, technical qualifications, and service ranks held (if any), should be sent to A.D.M.E. H.Q., 2 A.A. Group, Barrosa Barracks, Stanhope Lines, Aldershot, Hants. (L 403)

SALES ENGINEER required by large telephone and telegraph equipment company. Situated in S.E. London. Applicants must have had a good training in telecommunication engineering and a broad knowledge of modern telephone practice. Salary according to qualifications and experience.—Write, stating full particulars, to Box 48544, A.K. Advg., 212a, Shaftesbury Avenue, London W.C.2. (L 410)

TECHNICAL SALES REPRESENTATIVE wanted by manufacturers of electrical heating elements. Birmingham and Midlands area. An essential requirement is that the applicant should be able to create and maintain a live district organisation. Connections with industrial users of heating elements an advantage. Salary and commission.—Box No. 8055, Electrical Times. (L 400)

THE BRITISH IRON AND STEEL RESEARCH ASSOCIATION. ELECTRICAL ENGINEERS required by the above Association for research on a wide range of electrical engineering problems both in iron and steel works and in the Electrical Engineering Laboratory of the Association in London. Vacancies exist for both Scientific Officers and Technical Assistants. Applicants for Scientific Officer posts should have an honours degree in Electrical Engineering. Technical Assistants should have a National or Higher National Certificate. Starting salary up to £625 p.a. for Scientific Officers and up to £525 for Technical Assistants according to age, qualifications and experience.—Written applications only to Personnel Officer, B.I.S.R.A., 11 Park Lane, W.1. (L 432)

TRANSFORMER DRAUGHTSMEN for work on units within a range up to 10 MVA. Salaries in accordance with qualifications.—Apply Technical Director, Bryce Electric Construction Co., Ltd., Kelvin Works, Hackbridge, Surrey. (L 370)

TRANSFORMER DESIGNER, with experience of O.L.T.C. gear, required.—Please apply, stating age, qualifications, experience and salary required, to Box 8047. (L 391)

X-RAY. Foremost apparatus manufacturer offers an interesting overseas post for a TECHNICAL REPRESENTATIVE with commercial ability and sound electrical engineering background. Successful applicant would receive intensive training.—Apply in writing to Box No. 8059, Electrical Times. (K 411)

APPOINTMENTS WANTED

ASSISTANT SALES MANAGER, A.M.I.E.E. Switchgear and associated equipment, desires change. Midland or Southern area preferred.—Box No. 7099, Electrical Times. (L 254)

EXPERIENCED CHIEF ENGINEER (40), A.M.I.E.E., with wide mechanical knowledge, covering works and production of motors, generators, switchgear, gearing, electronics; adaptable.—Box No. 8043, Electrical Times. (L 388)

EXPERIENCED ELECTRICIAN requires permanent progressive situation in south of England.—Box No. 8061, Electrical Times. (L 415)

GRAD. I.E.E. (age 27) urgently desires a position with large contractor or consulting engineers in Birmingham area. Details on request.—Box No. 8063, Electrical Times. (L 416)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed. Edgware 8631 (4 lines).—Service Electric Co. Ltd., Stanmore, Middx. (D 324)

ARMATURE SERVICE CO. LTD., Haddington Street, Hove (Tel.: 32996), electrical engineers and winding specialists. Distance no object. (F 739)

CASTINGS, Fisher Foundries, Ltd., Great, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (L 318)

S. C. H. Co.

4b STANLEY ROAD, SOUTHEND-ON-SEA

Having the organisation to produce Trade Work from Blue prints to mass production competitively, are prepared to supply to Electricians for demonstration purposes

WARM o' COOL UNIT HEATERS

Particulars on request. (H 540p)

HOME COUNTIES. More than 10,000 sq. ft of excellent floor space suitable for LIGHT ASSEMBLY WORK, such as the assembly of electrical components, etc.—Write Box No. 8025, Electrical Times. (L 343)

WANTED: DRILLING, WELDING, all types, heavy and light, also MACHINING, all kinds, reasonable screwing facilities.—Birchills Repair Depot, Walsall. Tel. 3793. (L 342)

WANTED

A.C./D.C. MOTORS, STARTERS, complete change-over installation, etc.—A.A. Electrical Co. Ltd., 67 Rothschild Road, Chiswick Park, W.4. Tel.: Chiswick 5105. (A 20)

ISENTHAL VOLTAGE REGULATORS WANTED. Any condition.—Box No. 7069, Electrical Times. (L 205)

SCRAP ACCUMULATOR PLATES and Sediment wanted, any quantities. Also Storage Batteries purchased and dismantled.—Phone or write Elton Levy Co. Ltd., St. Ermin's (West Side), Caxton Street, London S.W.1. Tel.: WHItehall 9621/2/3. (A 3)

STEEL, ALUMINIUM, BRASS, Sheets, Strip, Bars, Off-cuts. Any quantity—immediate payment.—Grades Sheared Metal Co. Ltd., Green Lane, Hounslow, Middx. Tel.: Feltham 3274. (L 77)

WANTED, SCRAP ELECTRIC MOTORS, DYNAMOS AND CABLE. Top prices paid.—H. Reed, 36 Bridge Street, Leatherhead, Surrey. (K 11)

WANTED, ROTARY CONVERTORS, any size.—Universal, 221 City Road, London E.C.1. (A 16)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper Ltd., 176 Brady Street, Bethnal Green, E.1. (A 1)

WANTED, Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube Boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling. —Apply, giving full details to Midland Iron and Hardware Co., Cradley Heath. (A 5)

WANTED, D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co. Ltd., 22-26 Britannia Walk, London N.1. (A 13)

400 500, 800 cycle ALTERNATORS OR MOTOR GENERATORS wanted. All ratings, voltages and makes. Any quantity.—Wilfo Products, 216/226 Gorbals Street, Glasgow C.5. Tel. South 2385. (L 369)

AGENCIES

ENGINEERING AND LIGHTING EQUIPMENT CO., LTD., Sphere Works, St. Albans, Herts., require AGENTS (preferably with knowledge of commercial, industrial and street lighting fittings), who have established contacts with borough engineers and surveyors and British Electricity Authorities in the following counties: Dorset, Wiltshire, Devon, Somerset, Cornwall and Gloucester. Also, Kent, Sussex, Surrey and Hampshire. (L 313)

FOR SALE

CABLES & WIRE

ALL types T.R.S. and V.I.R. CABLE from Stock, at keenest prices in the trade. Send for List.—Northern Industries, Snow Hill, Manchester, 4. (D 50)

TINNED STEEL ARMATURE BINDING WIRE. All sizes from 14 s.w.g. to 30 s.w.g. supplied in coil or on reels.—Frederick Smith and Co., Wire Manufacturers Ltd., Caledonia Works, Halifax. (G 381)

LIGHTING EQUIPMENT

THERMAL FLASHERS

All Types

LAMPHOLDER, BLOCK, ETC.

C and R

ELECTRICAL ACCESSORIES

42 THAMES ST., HAMPTON, MIDDX

Obtainable from all Leading Wholesalers

Telephone: Molesey 4576

(K 222)

PURLEY CHOKES AND BALLASTS. Our 80w Tapped h.p.f. Ballast, with Starter Switch-holder incorporated, is proving itself the most popular unit. Suitable for most fittings. 57/6 each, subject.—F. W. Blanshard Ltd. (Dept. ET), Purley, Surrey. Uplands 4618/9. (E 343)

DOMESTIC APPLIANCES

IMMERSION HEATERS. Grubb 4 kW. No purchase tax. All lengths, 16 in. to 36 in. Standard voltages. Provision for intermediate loadings. Fully guaranteed. Write for illustrated brochure, latest lists and trade terms to distributors.—John Owner and Co. Ltd., Springfield Road, Birmingham 13. Tel.: Spr. 2939. (C 392)

GENERATING PLANT

ALTERNATING SET for sale. Motor driven on base-plate. In-put 70 h.p., 1,500 r.p.m.; d.c. out-put 400 V, 1 ph. 50 c/s. Starter panel with shunt regulator and a.c. voltmeter. F. J. Edwards, Ltd., 359 Euston Road, London N.W.1. Tel.: Euston 4681. (L 435)

DIESEL GENERATING SET. 220 V d.c. "Tangye" 34 b.h.p. Diesel Engine, "Magstarlite" 28.5 kW Generator, slate control panel 5 ft. by 2 ft. 6 in. voltmeter, ammeter, control resistance and double pole main switch. Very reliable plant. Inspect W. England.—F. J. Edwards, Ltd., 359 Euston Road, London N.W.1. (L 392)

METERS

A.C/D.C.— QUARTERLY AND SLOT-METERS Guaranteed, sent on approval if desired.—Brent Electrical Co., 6 Holmdale Gardens, London N.W.4. (A 15)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London E.C.1. (C 51)

METERS, a.c. and d.c., new and reconditioned, all types. Quarterly, single and three-phase, 3 and 4 wire, 2½ to 1,000 amps. Prepayment, single and double tariff, single, dual and triple coin, fixed and variable tariff, 2½ to 50 amps. M.D.I., Billiards Switches, Rent Collectors. Prices from 5/- carriage paid. guaranteed for ever, immediate delivery. Illustrated catalogue from The Electric Meter Company, Castor Road, Brixham. (K 678)

MOTORS & STARTERS

A.A. ELECTRICAL CO. FOR A.C./D.C. MOTORS, SWITCHGEAR, EXHAUST FANS, HOISTS, REDUCTION GEARS, new or reconditioned units.—Chiswick 5105, Fairlands 8279, 67 Rothschild Road, W.4. (A 19)

A.C. and D.C. MOTORS, all sizes, large stocks fully guaranteed.—Milo Engineering Works, Ltd., Milo Road, East Dulwich, S.E.22. (Forest Hill 2278-9). (A 10)

A.C. and D.C. MOTORS, GENERATORS, from stock.—Service Electric Co., Ltd., Honeypot Lane, Stanmore, Middx. Edgware 9631/4. (A 476)

A.C. and D.C. MOTORS, GENERATORS, SWITCHGEAR, etc., always in stock. Let me have your inquiries.—G. E. Whittaker, Wellington Mill, Bolton Road, Blackburn. Tel. 7232. (A 12)

FOR ELECTRIC MOTORS, GENERATORS, ALTERNATORS, SWITCHGEAR, please send your inquiries to Oldfield Engineering Co., Ltd., 98 East Ordsall Lane, Salford 5. (C 296)

ELECTRIC MOTORS, GENERATORS, TRANSFORMERS A.C. & D.C.

STARTERS, SLIP RING & D.C., SEMI-AUTOMATIC

Any voltage, new, short delivery, all types of revolving electrical power.

ELECTROPOWER COMPANY LIMITED

Kingsbury Works, Kingsbury Road, London N.W.9.
Telephone: COLindale 4621/2. (D 17p)

ELECTRIC MOTORS. Special purchase of unused electric motors made by ALPHA HARRIS to B.S.S.168. All standard industrial machines, enclosed ventilated, with endshield B/R bearings and standard shaft extension. Starters available. Immediate delivery. All covered by our 12 months' guarantee.

Qty.	*H.P.*	*Type*	*Voltage*	*Speed*
8	30	SR	400/440/3/50	1500
50	18	SR	400/440/3/50	1500
60	10	SR	400/440/3/50	1500
45	7½	SR	400/440/3/50	1500
5	25	SC	400/440/3/50	1500
15	20	SC	400/440/3/50	1500
26	15	SC	400/440/3/50	1500
4	12½	SC	400/440/3/50	1500
30	5	SC	400/440/3/50	1500
50	4¼	SC	400/440/3/50	1500
4	3	SC	400/440/3/50	1500
50	2	SC	400/440/3/50	1500
6	1	SC	400/440/3/50	1500
47	2	Split ph.	230	1500
26	1	Split ph.	1/50	1500
42	15	DC	220	1300
46	7½	DC	220	1500
50	5	DC	220	1500
34	15	DC	110	1400
76	12	DC	110	1350
16	9	DC	110	1200
16	7½	DC	110	1200
7	6	DC	110	1450
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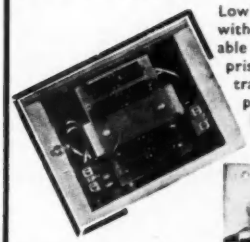

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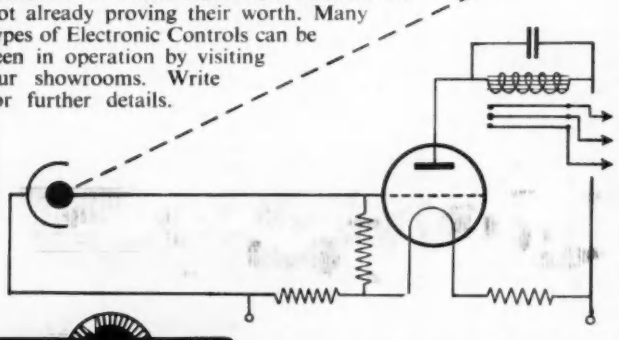

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90	750	Brook	S. Prot.	S. Ring
90	1,000	Brook	S. Prot.	S. Ring
90	970	L.D.M.	Enc. Vent.	S. Ring
75	740	Crom-Park.	T.E.F.C.	S. Ring
70	1,000	Brook	S. Prot.	S. Ring
70	1,500	Brook	S. Prot.	S. Cage
67½	1,500	E.C.C.	Enc. Vent.	S. Ring
65	1,500	Brook	S. Prot.	S. Ring
60	750	Brook	S. Prot.	S. Ring
60	1,500	Brook	S. Prot.	S. Ring
55	1,440	Brush	S. Prot.	S. Ring
55	1,500	Brook	S. Prot.	S. Ring
53	1,500	Brook	S. Prot.	S. Cage
50	750	Brook	S. Prot.	S. Ring
50	1,000	Brook	S. Prot.	S. Ring
50	1,500	L.S.E.	S. Prot.	S. Ring
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45	730	B.T.H.	S. Prot.	S. Ring
45	920	Phoenix	Protected	S. Ring
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40	580	E.C.C.	Protected	S. Ring
40	750	Brook	S. Prot.	S. Ring
40	1,000	Brook	S. Prot.	S. Ring
40	1,500	Brook	S. Prot.	S. Ring
40	740	Mather-Platt	Enc. Vent.	S. Cage
32	1,450	Wright	Protected	S. Cage
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25	1,000	Brook	S. Prot.	S. Ring
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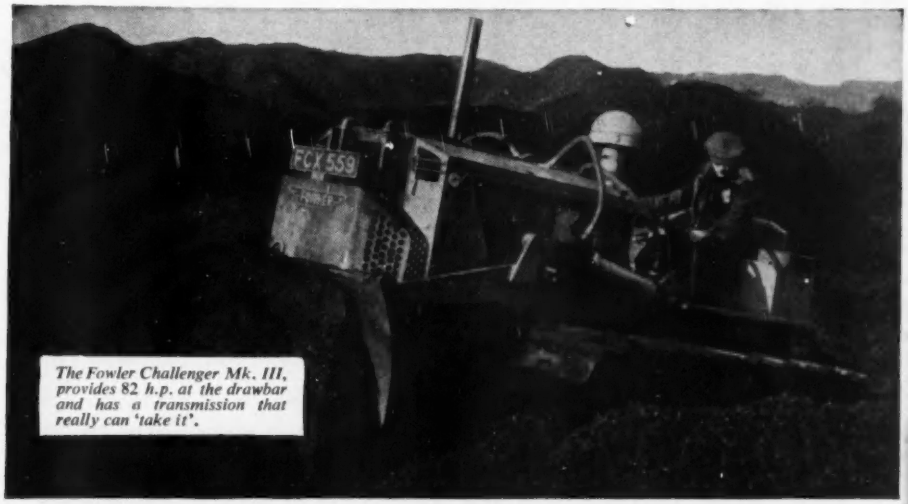

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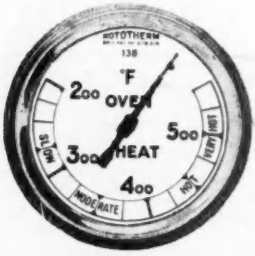

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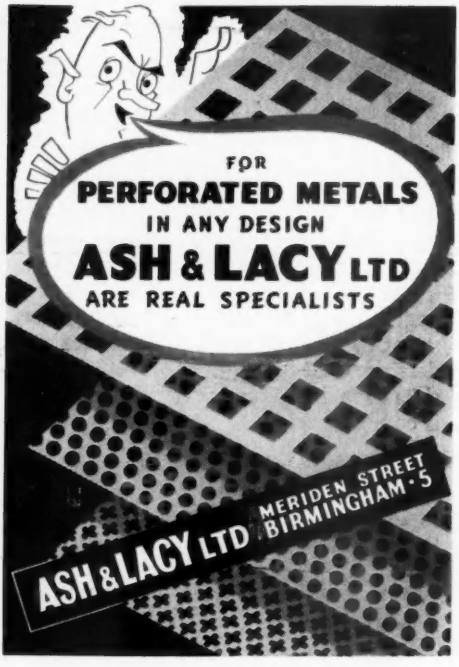

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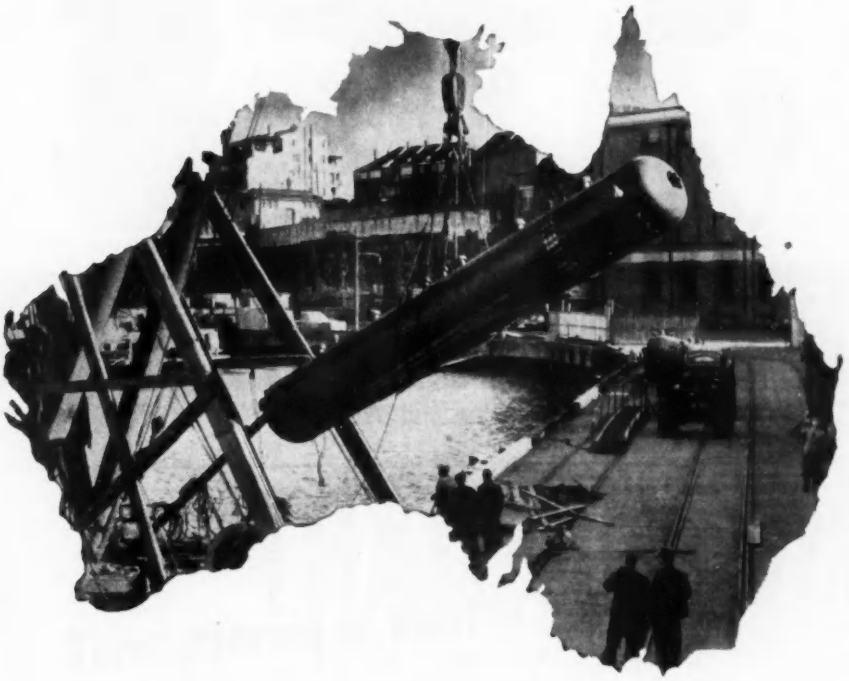

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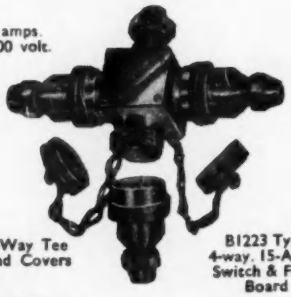

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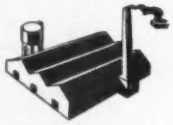

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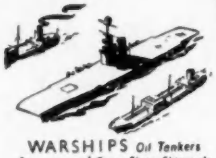

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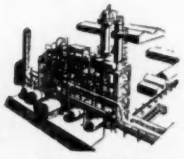

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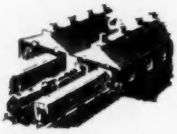

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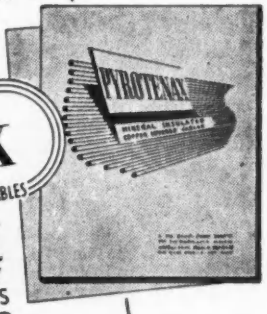

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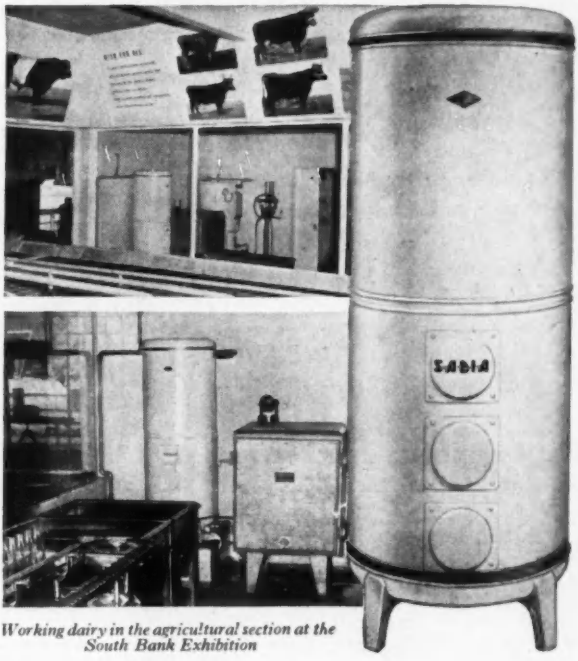

Working dairy in the agricultural section at the South Bank Exhibition

Sadia behind the scenes at the Festival

THE SADIA 50-gallon electric water heater in the model dairy at the South Bank Exhibition is there for every visitor to see. The unit supplies the hot water needed for washing equipment and utensils.

But, behind the scenes at the Festival, Sadia Water Heaters are making a much more important, although less obvious, contribution. For hot water is also required for cloakroom basins, cleaners' sinks and other services. At both the South Bank and Battersea sites, a large number of Sadia water heaters have been installed. In them over 1,300 gallons of hot water are kept ready for immediate use. Hundreds of thousands of gallons of hot water will be provided over the period of the Festival.

The choice of Sadia water heaters for these important services is no arbitrary one. For over 28 years Aidas Electric Ltd. have specialised in the manufacture of electric water heaters. In this time they have earned an unequalled reputation for quality and reliability. That is why Sadia water heating equipment is so often specified.

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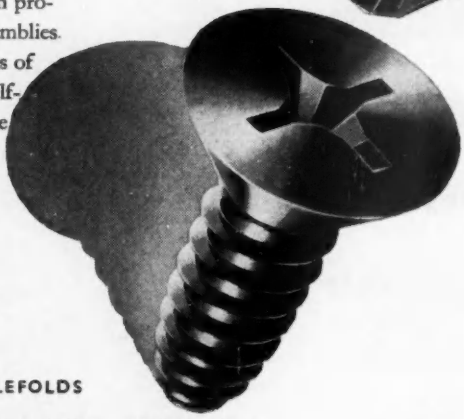

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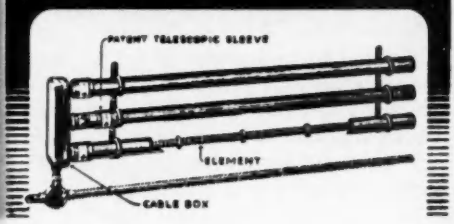

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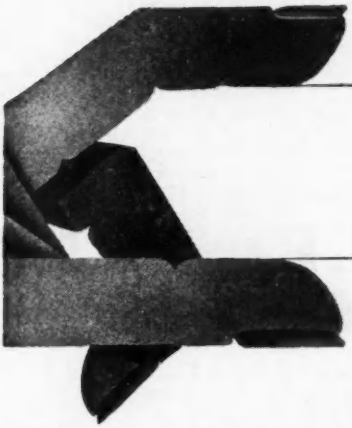

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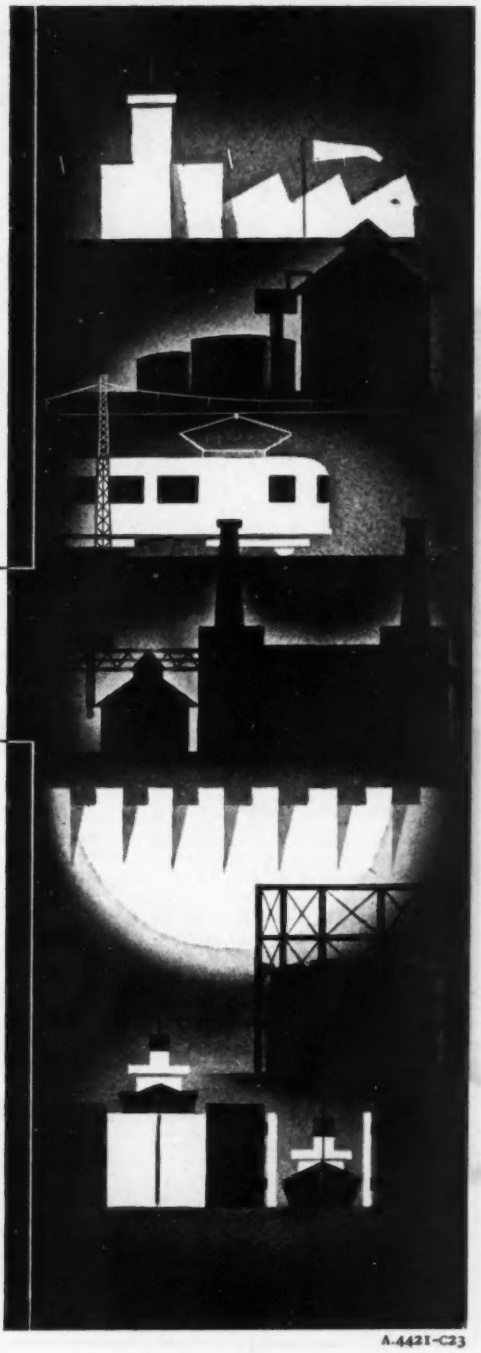

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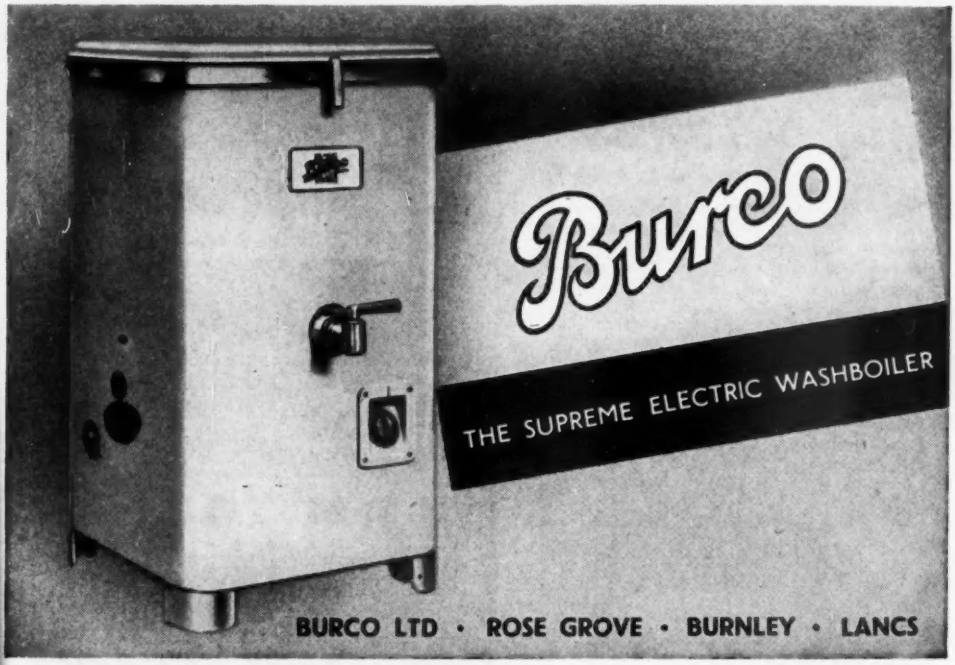

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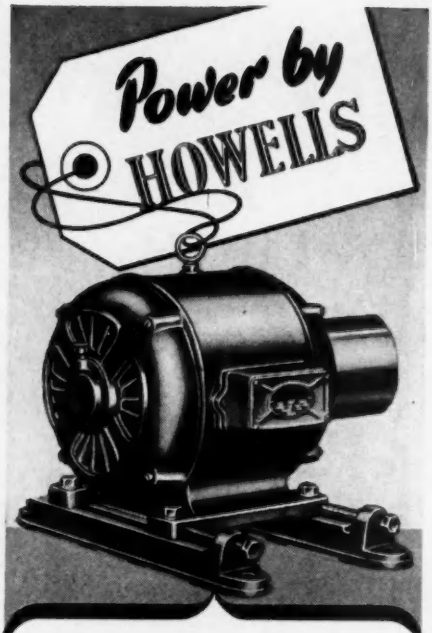

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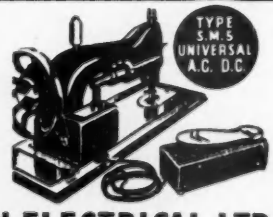

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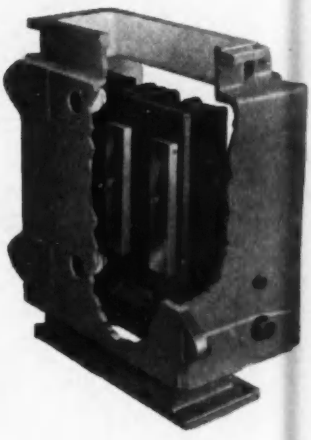

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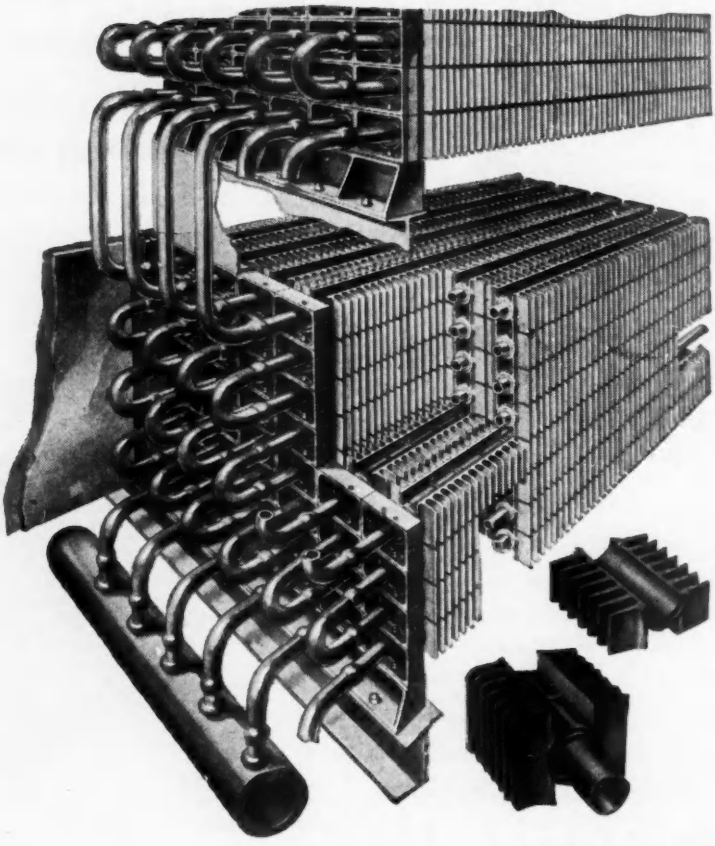

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